THE ENGINEERING AND MINING JOURNAL.

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NOTE.—Communications relative to the editorial management should be addressed to Mr. ROTHWELL. The articles written by Mr. Raymond will be signed with a star.

CONTENTS.

EDITORIALS :
Technical Education. 605
The Centennial Meeting of the Institute 605
The Feature of Our Iron Trade 606
A Capital Idea 606
Hydraulic Machinery at the Philadelphia Exhition, No. 1 607
International Exhibition of 1876 608
Conversazione of the Institute of Mining Engineers 608
Colorado Notes 608
Canal-Lock Lift 608
A Century of Mining and Metallurgy in the United States 609
Colorado Mines 615
Mining Notes from California, Montana, New Mexico, and Utah. 616
Notes 617
STATISTICS OF COAL PRODUCTION 617
COAL TRADE REVIEW 618
IRON MARKET REVIEW 619
METALS 620
FINANCIAL :
New York Stocks 621
Philadelphia Stocks 621
Gold and Silver Stocks 621
Copper Stocks 622
Gas Stocks 622
Advertisements. 622

TECHNICAL EDUCATION.

THE Joint Meeting of Civil and Mining Engineers, held at Philadelphia on the evening of the 19th and the morning of the 20th instant, proved to be even more interesting and profitable than was anticipated. The number of addresses or written papers on the subject of technical education, from members of one or both of the societies, and from distinguished foreign engineers, was about twenty-five. They are to be published in a pamphlet for a wider circulation ; and we think that, on perusal, they will be found notably free from conventional platitudes and abundant in suggestions of eminent practical wisdom. Some of them—we might mention particularly those of Capt. DOUGLASS GALTON, of London, and President THOMPSON of the Free Institute at Worcester, Mass.—contained reports of actual experiments upon various systems in the education of engineers, which constitute, after all, the best form of argument. Others, like those of Mr. COLEMAN SELLERS and other managers of large works, represented the question from the standpoint of the employer ; while numerous engineers of acknowledged standing and great experience contributed views, enforced by the authority of their own success, and by their thorough knowledge of the difficulties in the way. There was, by no means, a monotonous unanimity concerning the questions involved ; but the differences of opinion brought to light by the debate themselves became, in turn, the centers of light thrown upon the subject of debate.

Several points were asserted or admitted, however, with a striking degree of general consent. One was the unwisdom and injustice of conferring the degree of civil or mining engineer upon the graduate of a technical school at the time of graduation. It seemed to be universally agreed that this title should only be conferred after a post-graduate course in practice. Another unexpected declaration was made by almost every speaker—namely, that experience shows the value of a broad foundation of general culture as the true basis for training in a technical specialty. And, finally, all were agreed upon the necessity, either before, during, or after the technical school-course, of a course in practice. It was with special reference to the proper time for this practical course, that opinions differed. We shall not attempt to analyze the debate under this head ; but we heartily recommend the study of the published report of it to parents and guardians, as well as to students and teachers in professional schools, to managers of works and to engineers in practice. *

THE CENTENNIAL MEETING OF THE INSTITUTE.

THE meetings of the American Institute of Mining Engineers have apparently reached their maximum of interest and importance We say this, not because any sign of retrogression, or even of standing still, has been observed; but because it is difficult to conceive that the Philadelphia Meeting, now in progress, can ever be surpassed, either in pro essional or in social respects. We publish this week only the address of Hon. ABRAM S. HEWITT, the President-elect ; and we publish it without comment, because no comment is needed to point out its comprehensive character as a historical survey ; its great convenience and value as a statistical summary, or the profound philosophy, deeper even than statesmanship, with which it not only draws the horoscope of the future of industry, but analyzes the subtle and far-reaching tendencies of society, and gathering into one focus the lights of history, statistics, political and technical science, illuminates with their blended rays the inmost problems of human welfare and progress. The compilation of annals, and the arrangement of figures in rows, is a labor useful and honorable in its sphere ; but the power of reading aright the lessons which such texts should teach, of estimating correctly the conditions which they symbolize, and prophesying with sure and wise generalization the future which they promise, is only possessed by the few who are at once leaders in thought and masters in affairs.

The reception given by Mr. HEWITT after the meeting at the rooms of the Institute was, we need not say, thoroughly enjoyable and thoroughly enjoyed. For the rest of the proceedings we refer at present to the following programme issued by the Committee of Arrangements, and fulfilled, thus far, to the letter with overflowing success : *

PROGRAMME OF PHILADELPHIA MEETING OF AMERICAN INSTITUTE OF MINING ENGINEERS, JUNE, 1876.

COMMITTEE OF ARRANGEMENTS.

JOHN B. PEARSE, Chairman.
PERSIFOR FRAZER, Jr.
WM. LORENZ.
H. S. DRINKER.
I. W. MORRIS.
THEO. D. RAND.
JOHN BIRKINBINE, Secretary.

CENTENNIAL COMMITTEE.

ECKLEY B. COXE,
JOHN S. ALEXANDER,
THOS. EGLESTON,
R. W. RAYMOND,
WM. G. NEILSON.

Monday, June 19th, 8 P. M.

Joint discussion upon Technical Education, in the Hall of the Franklin Institute. Seventh Street, North of Chestnut Street. Members of the American Society of Civil Engineers, the American Institute of Mining Engineers, and Foreign Delegates will participate.

Tuesday, June 20th, Franklin Institute Hall.

10 A.M.—Continuation of discussion.

8 P.M.—Opening Session of American Institute of Mining Engineers. A. L. HOLLEY, C.E., President in the chair.
Address of Welcome, by FRANKLIN B. GOWEN, Esq.
Historical Address, by Hon. A. S. HEWITT, President-elect.
10 P.M.—Reception by President-elect, at No. 1,100 Girard Street.

Wednesday, June 21st, 10 A. M. till 2 P. M.

Session for reading of papers and discussions, in the Judges' Pavilion, Centennial Grounds.

8. P M.—Subscription Dinner at Belmont Mansion, Fairmount Park. (Full dress not expected. Special train leaves P. & R. RR. Depot, Thirteenth and Callowhill Streets, at 7.15 P.M., returning after dinner.)

Thursday, June 22d, Excursion No. 1.

Take steamer at Walnut Street Wharf, Delaware River, at 10 A.M., visiting Richmond Coal Wharves, Ship Yards, TATHAM'S Refining Works, League Island Navy Yard Dredging Machine and Gunpowder Pile-driver in operation. Girard Point Elevators. and Oilworks at Gibson's Point, thence to Chester, and return to Walnut Street Wharf.
8 P.M.- Conversazione at Headquarters, 1,100 Girard Street.

Friday, June 23d.

Sessions for readings of papers and discussions at Franklin Institute Hall, 10 A. M., 2 P. M., and 8 P.M.

Saturday, June 24th, Excursion No. 2.

Leave Philadelphia & Reading Railroad Depot, Thirteenth and Callowhill Streets, at 8.30 A M. Trains from Centennial Depot of the Reading Railroad at same hour, will connect with the excursion train at Belmont.

The following points of interest will be passed :—Fairmount Water Works (Water Power Machinery) ; Schuylkill Water Works (Cornish and Reciprocating Engines) ; Belmont Water Works (Duplex Pumping Engines); Falls Village and Manayunk (part of Philadelphia), large manufactories of textile fabrics, paper, pulp, and chemicals ; Pencoyd Iron Works (axles, bar, and bridge iron) ; Flat Rock Tunnel, 967 feet long ; Roxborough Water Works, Cornish and Duplex Engines, lift 365 feet ; William Penn Furnaces, 50x14, 40x12½, 35x12 ; Conshohocken, four rolling mills (sheet, plate, and imitation Russia iron) ; Merion Furnaces, 50x15, 40x12½ ; Plymouth Furnaces, 44x15, 42x15 ; Swede Furnaces, 2 stacks, 60x16. Norristown, Lucinda Furnace, 39x12 ; Norristown Furnace, 55x16, three rolling mills (plate, bar, sheet, and skelp iron and nails); Fort Kennedy, Montgomery Furnace, 50x14 ; Valley Forge. Phœnixville—Train will remain to allow time for visit to the Chemical Copper Company's Works where ores are treated by the HUNT & DOUGLAS process in the wet way ; Schuylkill Copper Company's Works, where ores are smelted ; Phœnix Iron Works, 3 furnaces, 50x14, 48x14, 36x15, bridge works and rolling mills, making bar, angle, tee iron, beams, channels, etc. Returning to Perkiomen Junction, and passing over Perkiomen and East Pennsylvania branches to Allentown, through Emaus Tunnel, 1,677 feet long, and near Emaus Furnace, 70x16, thence over Lehigh Valley Railroad to Bethlehem, passing Lehigh Furnaces, 60x17 and 55x16. Train stops at Bethlehem to permit of the inspection of the Bethlehem Steel Works, 5 furnaces, 62½x15, 45x15 50x14½, and two 70x18 ; spiegel furnace, 31½x10¾, rolling mills and Bessemer works, product iron and steel rails ; Bethlehem Zinc Works. Return by same route from Bethlehem to Philadelphia.

Monday, June 26th.

Franklin Institute Hall, 10 A.M., Business Session. 2 P M. and 8 P.M., Reading of papers and discussions.

Tuesday, June 27th, Excursion No. 3.

Leave Philadelphia & Reading Railroad Depot, Thirteenth and Callowhill Streets, at 8. 30 A.M., pass over former route to Phœnixville, thence through Black Rock Tunnel, 1,932 feet long, and past the following points of interest :—Royer's Ford, Wood Paper Pulp Manufactory ; Pottstown Anvil Furnace, 60x16, Warwick Furnace, 55x16, three rolling mill (bars, plate and nails) ; Monocacy Furnace, 50x14 ; Birdsboro', Keystone Furnaces, 55x15, 60x16, and two 43½x12 Nail Works.

Reading, Henry Clay Furnaces, two stacks 45x12 ; Reading Furnaces, 55x16 and 55x15 ; Rolling Mills (plate, bar, tube iron, etc.), Steam Forge. Train will stop for inspection of the Mills and Shops of the P. & R. RR. Company, making iron and steel rails, engines, cars. etc., thence by Lebanon Valley Branch to Lebanon, passing Keystone Iron Company's Furnaces, 50x15, 50x14 ; Robesonia Furnaces, 38x13 and 30x9 ; Sheridan Furnaces, 55x16 and 40x11 ; Lebanon, Lebanon Valley Furnace, 38x12 ; Lebanon Furnaces, 55x16 and 50x14 ; one plate and one bar mill ; thence by North Cornwall Railroad, passing Donaghmore Furnace. 44x14, North Cornwall Furnace, 52x15, Bird Coleman Furnace, 52x15. The train will remain, so that the Cornwall Ore Banks, the two Anthracite Furnaces, 38x12, and the Charcoal Furnace, 31x8 (built in 1745), can be inspected. This immense deposit of magnetic ore consists of three large hills inclosed on three sides by trap rock ; the extreme thickness is between 500 and 600 feet, and the visible ore is estimated at 64,000,000 tons. These hills have been wrought by open daylight quarry since 1728. Return to Lebanon, thence by Lebanon and Tremont Branch, passing Union Forge, where charcoal blooms are made, to Pine Grove. It will be noticed that we pass from the lower to the upper Silurian formation. Thence to Auburn by Schuylkill and Susquehanna Branch, passing Stanhope Furnace, 33x10, Jefferson Furnace, 31x7 (charcoal). From Auburn to Pottsville by main line, passing Schuylkill Haven, large coal shipping point (bar and rail mill) ; Mount Carbon (bar and plate mill). Remain at Pottsville over night. There are here the Pioneer Furnaces, 55x15, 50x13, and 50x12, two rolling mills (bar and rail iron, spikes, etc.), and also numerous collieries.

Wednesday, June 28th, 7 A. M.

Train leaves for Norwegian Shaft 1,600 feet deep. Returning to Pottsville, leave at 8 A. M. for a trip through the Southern and Middle Anthracite Coal Fields, passing numerous collieries, and the following points, Minersville Furnace, 55x15 ; Mine Hill Gap, Gordon Plains. The excursion will cross the Broad Mountain by these plains at an elevation of 1,500 feet above tide, and will stop at Ashland to visit the Tunnel Colliery and be entertained by LOUIS A. RILEY, Esq. Thence past the Mahanoy Plain to Shenandoah to inspect the Indian Ridge Colliery with its mammoth vein, 43 feet thick. Thence back to Mahanoy City through East Mahanoy Tunnel 3,400 feet long

to Tamaqua (bar and rail mill), connecting with the main line at Port Clinton (bar mill), passing Ringold's Furnace, 52x14; down the main line past Hamburg (rolling mill, bar iron), Lee's Port Furnace, 45x14, to Reading, back to Philadelphia.

Thursday, June 29th, 8 P. M.

Conversazione at Headquarters, No. 1,100 Girard Street.

Additional information will be cheerfully furnished by any of the Committee. For the convenience and comfort of the excursionists distinctive badges will be issued, which all are requested to wear. Guests, Red badges. Members of the Institute, Blue badges. Committeemen, White badges.

THE FUTURE OF OUR IRON TRADE.

THE question—Have we reached bottom in prices?—is asked by nearly every one in every branch of industry, and it is answered usually without much opportunity for knowing the causes which influence our markets. Our position at the head of a technical trade journal, naturally affords us many and great opportunities for observing the course and bearing of events, so that, without claiming any special gift of prophesy, it may be of interest to note, from time to time, such indications of returning prosperity, or the contrary, as may present themselves to us.

Our views, with regard to the needs of the iron trade, have been frequently expressed during the past two years. We consider it a self-evident truth that when the productive capacity of the works of a country exceeds its normal consumptive demand, there cannot possibly be other than depression, and falling prices in that industry. This has been pre-eminently the case in our iron trade, and it has also been true, to a somewhat less extent, in certain other industries.

A widening of our markets, by stimulating home consumption and opening up a foreign market for our surplus, are the only rational sources of permanent revival, and our success in each depends on our ability to reduce the cost of production to a point which will enable us to compete with England, Germany, or Belgium, in foreign markets. Two years ago, when we stated our belief that we could and must attain this point, and that the temporary expedients of higher tariffs and combination to reduce production and maintain prices, then clamored for by some of our "iron papers," were mischievous and inefficacious to remedy the evil we were laboring under, we drew down on us the ire and enmity of our protectionist contemporaries, and were freely denounced as "free traders" (used in an opprobrious sense) and as the enemies of our sorely distressed iron manufacturers. We can, unfortunately, confidently point to every phase through which the iron trade has since passed, as proving the correctness of the opinions we then expressed; and still further, we can point to recent editorials in our contemporaries strongly reiterating and supporting, in almost our own words, the views these same papers denounced us for suggesting and supporting two years ago.

Our protectionist friends secured the additional ten per cent. tariff they claimed would be the salvation of the iron trade, and that, we were told, would bring back "good times"—but it had absolutely no effect on the trade; it never, for a day, improved prices or increased sales, and now the fact is generally recognized, even by the most ultra-protectionist, that so far as the heavy iron trade is concerned, the ruinous competition is altogether among our own manufacturers, and that it is not a question of tariff, but of such economy in production and marketing, as will enable us to open up a foreign market for our surplus, and, at the same time, stimulate our home consumption by low prices. We are attaining both of these objects, and when we have so far succeeded as to secure a fair footing in foreign markets, we shall have reached "the bottom in prices," but not till then, though we may have occasional "spurts" in prices before the bottom is finally reached.

What figure will the bottom represent? This question cannot be answered definitely, for a price that two years ago would have opened wide the gates of foreign commerce to us, would not do so to-day. We have to compete with European countries, and we must look to them when we wish to ascertain whether the bottom has already been reached.

The reports of the Bureau of Statistics make a very favorable report of the increase in our exports of domestic goods during the ten months ending 30th April, 1876, as compared with the corresponding months of 1875. They were, for 1876 (ten months), $439,616,412 gold, and in 1875 (ten months), $427,085,512 gold. While our imports declined from $17,872,527 in 1875 (ten months), to $13,974,191 in 1876 (ten months).

This is, certainly a very favorable showing, when we consider that the English exports have largely decreased during the present year. The total exports for April, 1876, were only £15,430,177 as against £20,221,830, in April, 1875, and £19,432,270 in April, 1874. And this decline goes through the list almost without exception. The English iron and other manufacturing works are closing for want of orders, or because they cannot produce at a profit, at present prices, so that if this were the whole story, we could give good hope that a thorough energetic canvassing of foreign markets, with the view of supp'ying them with our products, would quickly lead us back to better times. But while we see much, very much that is encouraging in the present outlook, we cannot but observe with the most lively apprehensions the industrial storm that is clearly brewing in England and on the Continent. We greatly fear that the bottom has not been reached in England, and that the most serious distress, resulting, perhaps, in an industrial revolution, is at hand. It seems, indeed, as if those classes of manufacture which for many years have furnished a very large part of England's commerce, are about to be transferred, in large part at least, to countries more favored by nature or education. Most of the European countries have commenced the manufacture of iron with such success, as not only to supply very largely their own markets, but to enable them, in some instances, to send iron to England, and compete there with the most favored works. This country has almost ceased importing iron in any shape, and is now increasing its exports, which in a few years will, we believe, grow to very important proportions.

In cotton goods this country has fairly overtaken England, and if our cotton manufacturers could only be brought to realize the importance of economy in managing their works, we would soon compete successfully with her in foreign markets. India is also developing this branch of industry with wonderful energy, and the abundance and cheapness of the raw material, and of labor, will undoubtedly make her a formidable rival to this country as well as to Great Britain.

These, and other reasons, lead us to look for a period of very sore distress and exceedingly low wages in Great Britain, before the final return of those good times for which we have long been waiting. Few of our readers have any idea of the seriousness of the present state of industrial affairs in Europe, and especially in Great Britain, and he would be a rash man who would to-day predict the ultimate results. Should there be a general European war, which at present unfortunately does not seem altogether improbable, it would greatly stimulate some industries and utterly ruin some others. It would doubtless greatly improve business on this side, though there is no one who could desire a revival in business purchased at that fearful cost. And after a brief revival the great battle would still have to be fought.

The more general diffusion of knowledge, and the growing facilities for travel which enable the surplus labor of one country to go, at the cost of a few week's wages, wherever it can find better wages, is equalizing the wages item in the cost of production in all civilized countries. Natural advantages and the employment of scientific skill are becoming more and more the controlling elements in national supremacy in any industry. It is the increase in individual production and the improvement in the quality of the product rather than the day wages of the producer that have become the most important elements in the problem. With over-productive capacity, if not over-production in Europe, with works closing and wages being largely reduced in England, and with 420 out of 713 of our own blast-furnaces out of blast, and the market largely overstocked with all kinds of iron, we do not see any prospect of higher prices, and but little of maintaining those now ruling. It is not directly a question of tariffs or free trade, for the industry has grown beyond the limits where prices can be kept up by prohibiting the entry of foreign iron. There seems no other way of relighting our furnaces than by producing at a cost so low as to enable us to export, or of asking from the Government a direct bonus on every ton of iron exported, as has been done in France. In every event there are a number of furnaces built under the hotbed forcing process of exorbitant profits, which have produced their last ton of iron, and the investment in which is completely sunk, but before final abandonment there are many others that will be worked spasmodically, and will force on the market a sufficient quantity of iron at prices unremunerative to them, to give a despondent tone to the trade for a long time to come. The great reduction effected in the cost of steel has greatly stimulated its substitution for iron, and all the steel works in this country are to-day well supplied with orders, at remunerative prices. They are certain of a good business for the balance of the year, and, probably, for some years to come.

The low prices we now have, and are likely to have for some time to come, will increase consumption at home, and it is already aiding us in getting the cost of manufactured iron to the exporting point.

A CAPITAL IDEA.

WE take the following from the New York *Herald's* telegraph report of the meeting of the Institute, not having noticed it in reading Mr. HEWITT's address, we hasten to add it to the record:

"Hon. ABRAM S. HEWITT was elected President of the Institute and delivered a historical address upon the mining and metallurgical industry, showing the large increase in iron and coal production in the United States over that of other countries. He suggested for the social and moral improvement of the condition of coal operators a tax of five cents per ton on coal by the anthracite companies."

We all knew of the shortcomings of our coal operators, and have sometimes had to hint that they do not act invariably "on the square" in the matter of living up to their programmes, but we had no idea that their "social and moral condition" had attracted such universal attention, that the President of the Institute of Mining Engineers should have felt called upon to suggest the advisability—of imposing a tax of 5 cents a ton on the coal mined to provide a fund for their amelioration. In the anthracite trade this tax would amount to about $1,000,000 a year, and as all the obliquity in the trade is universally attributed to the six great "operators" who regulate this business, it is fair to assume that the bulk of this sum, say $150,000 a piece, should be devoted to the special "social and moral improvement" of these distinguished gentlemen. No doubt so arduous an undertaking will require corresponding means, and we can only regret, that these were not indicated in the same dispatch, whether it would be the employment of an army of MOODYS and SANKEYS, or whether it would require the high pressure action of some patent "KEELY-motor-appliance-for-the-moral-improvement-of-the-race," we are left in total ignorance, but assuming the complete success of the undertaking (and we must certainly consider the work cheap at the price—) what a glorious millenium would reign in the anthracite trade—we should hear no more of "under-

cutting" and "gauging." There would be no more complaints of "want of cars" and "unfair discriminations," the meetings of the Combination would be councils of peace and good will, and of mutual admiration, while the whole world would point with pride and satisfaction to this happy family of coal operators.

When we think that all this is to be accomplished at an expenditure of only $150,000 a piece, who could grudge an increase of 5 cents a ton for his coal. With so admirable an example there should be no difficulty in "improving the moral condition" of the small fry among the operators with the odd $100,000 remaining.

We can all of course recognize the need of "improvement in the moral condition of the operators." Every one knows they are all blacker than the ace of spades, but from the modest standpoint of the engineer and journalist, we cannot quite realize the immediate necessity for an improvement in the princely social condition in which they live. Anyway we would like to know practically more about it before fully indorsing this recommendation of the President of the Institute—or the telegraph operator, whichever it may be.

HYDRAULIC MACHINERY AT THE PHILADELPHIA EXHIBITION—No. 1.

THE arrangement originally made by the architects of Machinery Hall, for the exhibition of pumping machinery, has proved itself to have been a very good one. The space allotted for this purpose has proved to be too small, but this difficulty could not have been foreseen at the time when the building was erected.

The pump annex, as that portion of Machinery Hall which is given up to the exhibition of hydraulic and pneumatic apparatus is called, is a rectangular wing, on the center of the south side of the hall, immediately beyond the large Corliss engine. The length of the annex running north and south is 208 feet, and its width is 210 feet. In the south central portion of the annex, a tank has been built 160 feet long, 60 feet wide, and 8 feet deep. The north end, and east and west sides of this tank, have been built of cement-laid bricks. Its southern end, which serves to support a heavy water tank with its supporting columns, is built of stone and brick. This large elevated tank is used as a reservoir, from which flows an artificial sheet of water into the tank below, from which it is constantly raised by means of pumps, which will be spoken of hereafter.

The floor of the tank was made by filling in broken stone to a depth of about twelve inches, which was then covered with three inches of Rosendale cement. In the plans as originally made, it was intended that all pumps should have their suction pipes carried into the main tank, but a wise afterthought led to the building of two square sided culverts running parallel with, and 27 feet distant from the long sides of the tank. These culverts were 6 feet high, and 3 feet broad, their bottom level being 16 inches above that of the tank. To connect these culverts with the water in the main tanks, two culverts of the same size as those just spoken of, go from the middle of each side of the tank to the principal culverts. In addition to these, two passages 4 feet 10 inches above the tank floor, and three feet wide have been built, connecting the southern ends of these long culverts with the tank, the water standing about 12 inches deep in them when the tank is full. The tops of the principal culverts were only covered with the floor planking, so that the suction pipes from the pumps were easily carried down to the water. By having the level of these culverts 16 inches above that of the tank, mud and other substances which settle in the latter, are not drawn through into the pumps.

The supply of water is obtained through a 6-inch pipe connected with the water supply system of the Exhibition; the pipe entering the tank at the middle of its north end. Two-12 inch pipes, one at the northeast, and the other at the southwest corners of the tank, serve to drain off the water when necessary. Along both of the long sides of the tank, iron railings 14 feet 2½ inches in height above the floor, are placed on which rest the discharge pipes from all the pumps which send their water directly back to the tank.

At the south end of the tank are erected the reservoir and pumps, which are used each afternoon to produce the sheet or fall of water spoken of above. This reservoir, which is made of one-quarter iron sheet, is supported on six iron columns having a height of 26 feet 3 inches above the floor level. It is 35 feet 10 inches long, 19 feet wide, and 4 feet deep. The side 35 feet 10 inches long, which faces the large tank, has a projecting lip built out upon it, over which the flow of water going into the tank takes place. To provide for the testing of turbine water wheels at the Exhibition, a four feet vertical flume, with turbine case at the bottom, has been built from this reservoir. The turbine case is conveniently arranged to admit the wheels for testing.

Another 12-inch flume from the reservoir supplies water to a small turbine, which is permanently fixed. Two Andrews centrifugal pumps, which will be spoken of hereafter, supply 30,000 gallons of water per minute to the reservoir. The supply of power to those pumps using steam, is furnished by two 10-inch pipes which are hung at a height of ten feet above the floor, and directly over the water conduit in which the suction pipes of the pumps are placed. Those pumps which are worked by belts are supplied with power from two lines of shafting driven by the Corliss engine.

The exhibit of pumping machinery in the Hydraulic annex does not lack at all in variety, almost every form being represented, with the exception of those working on the Cornish principle. Another part of Machinery Hall contains, however, a very fine example of this class of pumps. As would naturally be expected, the greatest display of pumps belonging to any particular system, is that of those which are horizontal direct-acting reciprocating pumps, with steam cylinder operating a piston rod common to both steam and water cylinders. This class of pumps have been principally developed in this country, and it is only within a few years that they have been adopted abroad. In England, where their use has now become quite considerable, the inventions of American makers have in several cases been directly purchased and copied, the names of the inventors or of the particular class of pumps being used by these makers in selling them. Experience has shown that these pumps, when well constructed, are better suited for many classes of work than those in which the complication of fly wheels and shafts are introduced, or where the application of the power is made through the intervention of shafting and belting. Briefly, some of the advantages which can be rightly claimed for this class of pump over other forms can be enumerated as follows: 1st. Compactness of construction in proportion to capacity, which admits of their being used in confined places which would not be suitable for other classes of pump. The compactness of structure is also of advantage in giving stiffness to the pumps, an important quality when performing ordinary duty, and which in cases of emergency, when heavy service is required, is a particularly valuable one. 2d. Directness in the application of the power, the force of the steam being applied to the water directly through a common piston rod. 3d. Simplicity in working parts. The difficulties and vexations which result from the wear and derangement of pump machinery, make this quality a very important one. 4th. Most of the pumps made on this system have but a small proportion of the moving parts uncovered, so that derangement and wear resulting from the presence of dirt or other obstruction is much less frequent than in the case of pumps of more complicated construction. 5th. Only very simple and light foundations are necessary to set these pumps upon, so that where it becomes necessary to change them from place to place in temporary workings, the operation of removal is neither difficult nor costly. This quality is often of great advantage when it becomes necessary to pump out shafts filled with water, in which cases these pumps can be successfully used when simply suspended by chains. 6th. The compactness of arrangement and small number of working parts admits of these pumps being sold at low prices.

Among the disadvantages which these pumps as a class possess may be enumerated, 1st. Uneconomical use of steam when compared with other systems. The steam in many of the ordinary forms of these pumps is used without any attempt at expansion, a fact which explains what much of this loss of effectiveness results from. Then considerable steam has to be used in cushioning the strokes of the pistons both in the steam cylinders and valve chests, the useful effect of a large portion of which is lost. The wire drawing of the steam through slowly uncovered ports, is another source of loss. Recent improvements which have quickened the valve motion, have, in a great degree, removed this objection. The location of these pumps in places where they are exposed to the condensing action of moisture in mines or cold atmospheres, as in Winter, and where the steam has to be carried through long pipes, is frequently a source of great loss. In another respect they sometimes give considerable trouble, this is with regard to starting them when desired. Now every pump manufacture claims that his pump is the only one in which this difficulty does not exist, this particular superiority alleged indicating clearly the difficulty which all these pumps at times experience. Being made direct-acting a derangement of the steam or even of the water valves may result in the breakage of cylinder heads where the use of shaft and crank connections would perhaps prevent such accidents.

The two finest exhibits of these direct-acting pumps are made by the KNOWLES Steam Pumps Works, of Warren Mass. and the GEO. F. BLAKE Manufacturing Company of New York City. With regard to the mechanical quantity of the work turned out by these two concerns there is no choice.

Both castings and fittings are well made and finished. The peculiarities which distinguish these two kinds of pumps from each other, and in fact all direct acting pumps are mainly with regard to the arrangements for moving the valves of the steam cylinders. This is generally accomplished by means of an auxiliary cylinder placed above the valve chest, in which cylinder is placed a piston or plunger, whose motion to and fro slides the steam valve over its seat, the two being loosely locked together. The way in which the pistons in the auxiliary cylinders work is as follows: By means of cams or arms on the main piston rods of the pumps, or by the striking of the steam piston heads against rods connected by levers with the valve steam of the auxiliary cylinders, the live steam from the boilers is admitted to one side of this auxiliary piston, the other end of the cylinder being in communication with the exhaust side of the large steam cylinder. The consequence is a rapid motion of the auxiliary piston under the influence of the steam, which draws with it the steam valve of the large cylinder.

In the KNOWLES Pump the ports are opened in the auxiliary cylinder by the positive motion of the pump piston-rod, which acts so as to give a slight motion of rotation to the piston in the auxiliary cylinder. This rotation opens a port and admits steam from the boilers, which has the effect of throwing the plunger to the other end of the cylinder, drawing with it the main steam valve. To give this motion of rotation to the auxiliary valve, two devices are used. In both cases the valve steam from the auxiliary cylinder is carried out toward the water cylinder, and an upright arm is keyed on the principal piston rod, the upper end of which works along the valve stem. To produce the motion of rotation in the first and older forms of these pumps, two lugs having V-shaped projections on them were fastened by set screws to the auxiliary piston stems, and when a cam on the upright arm from the main piston rod strikes them, a slight rotation of the stems, and with them the pistons is produced. Should the pump be working properly, the auxiliary piston then immediately draws the valve stem away from the upright arm of the piston rod, and the main steam valve is at the same time opened. In case, however, that the steam does not operate in this way, the motion of the auxiliary piston is made compulsory by the pressing of the upright arm against the lug on the valve stem, so that if these parts do not break, the main valve is opened before the piston has completely finished its stroke. This arrangement is, undoubtedly, a good one, assuring, as it does, either an automatic or a positive opening of the steam valves. In nearly all the pumps now made by the KNOWLES Company, the admission of steam into the auxiliary cylinder, through the partial rotation of the plunger which it contains, is effected by a different device from that just described. A long rocking lever, whose axis is placed at the center of the bed-plate, between the water and steam cylinders, is moved up and down alternately through small arcs, by means of a small roller working against the under side of this lever, and which is fastened to the center of the main piston rod. The motion of this rocking lever is communicated to the piston in the auxiliary cylinder by means of a connecting rod and lever at one end, which are respectively connected with the rocking lever and the stem of the auxiliary piston. Like in the last described method of moving the valve-gear, an upright bar keyed on to the main piston rod and sliding on the stem of the auxiliary cylinder, assures the opening of the steam valves in case the auxiliary piston does not move under the influence of the steam alone.

All the pumps made by the KNOWLES Company have their valves operated in either one of the two ways just described, which make it necessary that the distance between the water and steam cylinders should be a little greater than the length of the pump stroke. This prevents a compactness of arrangement which other makers, by using different valve motions, are able to obtain.

It is only, however, in special cases where the working room is very limited that this peculiarity can prove objectionable. The prevention of shocks both in the auxiliary and main steam cylinders is effected by steam cushioning. As the amount of this, necessary in the main cylinder, is variable in proportion to the rapidity of motion of the piston, the special ports which convey the steam for this purpose are provided with stop valves, by which the amount of cushioning is controlled at will. The variety of pumps made for special purposes by

the KNOWLES Company is so great that only a few of them can be spoken of here.

The mining pumps are constructed on three different plans. Two of these are short connection horizontal pumps, while the third is vertical and single acting, with pump rod going down into the mine shafts.

The first forms of horizontal double-acting mining pump are represented in the exhibit of the KNOWLES Company by a pump whose general dimensions are as follows: diameter of steam cylinder, 24 inches; diameter of plunger, 10 inches; stroke, 24 inches. The suction and delivery valves are placed in two chambers, one above the other, in a box cast on the top of the water cylinder. The valves are made of thick circular disks of hard rubber, having a free play upward of a few inches. The valve seats are made of brass, each set being cast in one plate. Side plates, bolted on to the valve boxes, allow the valves to be easily examined. Pumps of this class are principally used in mines where the lifts are from 400 to 450 feet in height. The second class of mining pumps are represented by a double-acting plunger pump, having the following dimensions: diameter of steam cylinder, 18 inches; diamether of plunger, 7 inches; stroke, 24 inches. This pump differs from the one just described in the arrangement and composition of its valves. It has been found that where the attempt is made to raise water by direct lift to heights of from five to fifteen hundred feet that the valves and valve boxes must be made very massive to resist the great pressure of water upon them.

These pumps have the delivery and suction valve boxes cast in one piece with the cylinder, the suction valves being placed along one side, and the delivery on the other. Both the valves and their seats are made of gun metal. They are reached from the exterior by screw plugs of gun metal, there being one of these for each valve. A pump of the same size and pattern as this one has been raising water in a direct 900-feet lift at the Ontario silver mine in Utah. For forcing petroleum oil through long lines of pipes, the same kinds of pumps are used, the play of the valves being made a little greater than in the case of the water-forcing pumps.

For working pumps singly or in relays on the Cornish system, the KNOWLES Company have designed a special vertical pump. The steam cylinder is set directly over the shaft rod, the steam valves being worked as in the ordinary pumps of their make. The pump rod is connected with one, or a series of single acting plunger pumps, in the usual manner. It is generally found best to put weights on the pump rods when the water is carried up by a single lift, so that the steam raises the rod with its attached weights, which alone are heavy enough to force up the column of water by their descent. Although more simple than the Cornish pumps, they must be much less economical in duty, owing to the way in which the steam is used. In mines where the depth is not great, piston pumps can sometimes be used to advantage for raising water. For this class of work the KNOWLES Company make a pump with a removable gun metal lining, which offers the advantage of being easily changed when worn by service, or when more power in proportion to the amount of water raised is required, a smaller sized lining can be substituted.

INTERNATIONAL EXHIBITION OF 1876.

Special Report of the Engineering and Mining Journal.

ADMISSIONS FOR THE WEEK ENDING JUNE 20, 1876.

Date.		Paying Visitors.	Press, Complimentary, and Exhibitors.	Total Visitors.
Previously reported.....	.....	669,392	329,080	998,472
June 14.....	31st Day..	29,812	12,401	42,213
" 15.....	32d " ..	31,937	12,142	44,079
" 16.....	33d " ..	25,903	11,967	37,870
" 17.....	34th " ..	25,902	11,982	37,884
" 19.....	35th " ..	23,372	11,881	35,253
" 20.....	36th " ..	27,204	*	27,204
Totals.....		833,522	389,453	1,222,975

* Not reported.

CONVERSAZIONE OF THE INSTITUTE OF MINING ENGINEERS.

THE usual weekly meeting was held at the rooms of the American Institute of Mining Engineers on Thursday evening, June 15th. Owing to the reception given to the Civil Engineers the same evening by Prof. FAIRMAN ROGERS, not many of that society were at the rooms of the Mining Engineers. A considerable number, however, were present, and the evening passed off very pleasantly. Prof. T. EGLESTON, of the Centennial Committee, called upon Dr. J. LAWRENCE SMITH, of Louisville, Ky., for some remarks. The Doctor, in responding, said he should confine what he had to say to the subject of iron and, particularly, with reference to the influence of some of its impurities on its chemical and physical nature. He said that the general proposition that phosphorus was hurtful to iron, was not always a correct one, as it sometimes proved highly beneficial The well-known fact that phosphorous makes iron more fluid and, therefore, better suited for casting purposes, is but one of the good qualities which this element adds to cast iron. While at the Vienna Exposition, his attention was drawn to the large iron vessels in which the parting of gold and silver, by sulphuric acid, was carried on in the Government mint. He found that these vessels lasted for a long time, and were but slightly affected by the action of the acid. Chemical examination showed that this quality was, probably, due to the presence of as much as three or four per cent. of phosphorus in the iron. An examination of the iron showed it to be white and very compact in character. Dr. SMITH explained the non-action of the acid on the iron as being due, in a large degree, to its very compact structure, which does not permit the acid to penetrate and attack it as a gray iron would do. Since he had returned to this country, a piece of iron had been submitted to his inspection which possessed this non-corroding property in a high degree. This specimen was brought to Dr. SMITH as being a piece of unknown metal. He quickly saw that it was a piece of white iron, and after breaking off several small bits be put them in a flask with some aqua regia and set the whole on a sand bath, expecting that the iron would soon dissolve. On returning some time afterward, he was surprised to find that the acid had not affected the iron in the slightest degree. Another trial only produced the same result. Digestion in iodine for a considerable period gave similar results. Sulphuric, nitric, and hydrochloric acids were tried, but did not affect the iron at all. When, however, hydrofluoric acid was used, the iron was attacked and, after some time dissolved, indicating that much silicum was present. Partial analysis showed that this element entered into the composition of the iron to the extent of from four to five per cent. Further experiments made to test its powers of resisting acids and oxidizing agents, have shown that, with the exception of hydrofluoric acid, nothing but fusion with bisulphate of potassa affects it even superficially.

Following Dr. SMITH, Mr. J. DEBY said that he had recently received some facts from Belgium with regard to the use of cryolite in refining iron, which might be of interest. It was found that this mineral, when used to the extent of one per cent. or even less in the puddling furnace of PERNOT'S system, had the effect of not only quickening the process of puddling, but also produced a very superior quality of malleable iron from inferior pig iron. The considerable cost of the cryolite, however, prevented at present its use for this purpose.

COLORADO NOTES.

Special Correspondence of the Engineering and Mining Journal.

TO THE EDITOR: SIR—At last I am able to report that the long-delayed Summer is fairly upon us, and the mining operations for the season in full blast. The gulch is alive with miners, and the supply of water abundant.

The Malta Smelting Company's Works, under the management of EMILE LOESCHER, Esq., have commenced what promises to be a most successful season, as the supply of ore will be abundant.

The Printer Boy Mine is shut down, and will not be worked until the return of Hon. J. MARSHALL PAUL, "Managing Secretary," from the Centennial.

The Oro Ditch and Fluming Company, Manager, Mr. WOODS, is working a large force. This ditch is nine miles in length, and the flume over a mile; this ground has been partly worked before, but unsuccessfully, owing to the scarcity of water. With the present plentiful supply of water, and the use of the hydraulic, the company expects a rich harvest. The mountains are lively with prospectors, and so thoroughly will the work of prospecting be performed, "now that we have smelting works to buy the ore," that I expect e'er long to chronicle many valuable discoveries.

The Dyer Lode (TABOR & HENDERSON) continues to open out splendidly, and buildings are being put up to work a large force.

The Little Willie (LEE & DOYLE) continues to delight the hearts of its owners.

A new lode, not yet baptized, near the Dyer, has been discovered by CLEARY & MURPHY, and assays 40 ozs. in silver, and 74 per cent. in lead.

The Wonder, one of the largest deposits of galena we have, is about to be worked by Mr. WOODS, Agent of the Ditch Company.

The Iowa Lode, owned by J. W. TISDAL, J. P., shows a large body of ore running from 28 ozs. to 240 ozs. silver to the ton, and will average 20 per cent. in lead.

The Hidden Treasure will be worked by GEBERT, HAYES, and RESCHIE. It shows 4 feet of mineral between walls, running from 10 ozs. to 60 ozs. in silver, and 60 per cent. in lead.

All the lodes that I have mentioned in previous letters have started work. As the prospecting has but just begun, I cannot, of course, say much of new discoveries just yet; but from the present outlook I will have plenty of news for you of that kind this season. M. H.

ORO CITY, Col., June 12, 1876.

CANAL-LOCK LIFT.

THE device for the Potomac Lock and Dock Company for lowering canal boats from the canal to the river at a point about a mile and a half above the Aqueduct Bridge, Georgetown, was yesterday morning subjected to the test of experiment and gave every indication of successful operation. This is an engineering enterprise of considerable interest to the trade of Georgetown and to the carrying business of the Chesapeake and Ohio Canal, and is the only one in existence in the United States.

The inadequacy of wharfage facilities at Georgetown has long been the occasion of great difficulty, inconvenience, and delay alike to merchants and transporters, canal boats being often detained as much as a week before getting an opportunity to unload, while vessels in the river are also subjected to considerable delays in waiting for their cargo. The new improvement above referred to is intended to remedy this difficulty by letting the canal boats down into the river.

At the point above-mentioned (a mile and a half above Aqueduct Bridge) a dock has been constructed on the right of the canal into which boats intended to be lowered into the river are turned aside. At the lower end of this dock is a gate, through which the boats are to be passed into an immense tank, technically known as a "caisson," which has a water-tight gate at each end. The upper end of this tank forms a water-tight joint with the lower end of the dock, and by opening the gates a boat is readily transferred from the dock to the tank, after which the gates are closed, and the tank or "caisson," with a canal boat afloat in it, is prepared to transport its burden to the river. The tank is mounted on trucks in such a manner as to keep it level, and is let down to the river by means of a double-track railroad, which runs out into the water far enough to sink the tank entirely below its surface, in which position the boat is floated easily out into the river. This tank is let down and drawn up by means of a turbine wheel of sixty-eight horse power, which, however, would be wholly inadequate for the purpose but for the fact that the weight of the tank is balanced by that of two great cars loaded with rocks, which move on side tracks, descending the inclined plane toward the river as the tank ascends from the river toward the dock, and *vice versa*. The tank is kept full of water in ascending, and, as a canal boat on entering it, displaces exactly its own weight of water, the weight of the tank and its contents remains invariable, and the balance between it and the cars on the side tracts is thus constantly maintained. The traction is applied by means of immense wire cables, which pass over iron wheels of great strength, the turbine wheel merely furnishing power enough to overcome inertia and friction.

The trial made recently, under the supervision of Mr. HUTTON, chief engineer of the Chesapeake and Ohio Canal, gave every indication of successful working.—*Washington Chronicle.*

GREAT BRITAIN'S EXPORTS OF IRON.—There were but two tons of rails shipped to the United States during May, and but 96 tons from January 1 to May 31. The total exports of rails to all countries from January 1 to May 31, were 141,723 tons, as against 201,219 and 335,093 tons for the corresponding periods of 1875 and 1874, respectively. The total exports of iron and steel to all countries from January 1 to May 31, were 837,397 tons, as against 929,596 and 956,821 tons during the corresponding periods of 1875 and 1874, respectively.

A CENTURY OF MINING AND METALLURGY IN THE UNITED STATES.

Centennial Address of Hon. Abram S. Hewitt, President Elect of the American Institute of Mining Engineers, Philadelphia, June 20, 1876.

GENTLEMEN.—If my first words were other than those of thanks for the high honor of being called to preside over the American Institute of Mining Engineers, I should do injustice alike to you and to my own sense of the obligation, under which I have been placed by your voluntary choice. When the position was first suggested to me, I resolutely declined to allow the use of my name, on the ground that by training and occupation, I was not entitled to this honor, which, it then seemed to me, should be conferred only on a professional engineer. In fact, the history of the Institute, which had honored itself, as well as my distinguished predecessors, DAVID THOMAS, ROSSITER W. RAYMOND, and ALEXANDER L. HOLLEY, by elevating them to its highest office seemed to indicate the line and the limit of safe precedent, in which I did not then see how I could be included.

But my scruples were finally removed by the consideration, that as in the course of human industry, the Pioneer, of whom Mr. THOMAS was so marked a type, must precede the Mining Engineer, so fitly personified in Dr. RAYMOND, and be followed by the Mechanical Engineer, whose incarnation we behold in Mr. HOLLEY, so all these must be supplemented by the man of affairs and finance, in order that "enterprises of great pith and moment" may be prosecuted to a successful issue. I felt, therefore, that I had no longer any right to resist your preference, or to deprive myself of what I must regard as the crowning honor of an active career.

On an occasion like the present, it seems appropriate to review the history in this country, during the last hundred years, of those industries which the Institute of Mining Engineers specially represents. There is much in the story with which other members of this body are more familiarly acquainted than myself; yet I fancy that to all of them, and not less to our distinguished and most heartily welcome guests from abroad, a comprehensive outline of the progress of mining and metallurgy in the United States will prove interesting. I ask your attention, therefore, to a condensed account of that subject, embracing a statement of the beginnings of the industry on our shores, of the notable events attending its increase, and of its present condition after a hundred years of national life. The extent and rate of our progress will be shown more clearly by figures than by words, and I shall offer a series of tables, carefully compiled from the best available sources, and showing the production of each of the leading metals, year by year. This general survey would be incomplete without some account of the legislation of the Federal Government with regard to mining, the principles upon which it has been based, the effects which it has produced; and finally, I shall attempt to point out some causes and agencies which, under our institutions and habits, may be, in my opinion, relied upon to effect certain great ends of technical efficiency, political economy and social equity, which our Government has not attempted, and could not fairly be expected, to achieve.

Many of the topics I have named are more or less familiar to me in my experience as a man of business, a student of public affairs, and a zealous inquirer into the social and industrial problems of the present generation. But the collection and arrangement of facts in my possession, the search for other facts to complete the record, and the orderly expression of the whole in connected form would have been a labor at this time utterly beyond my powers, already overtaxed by intense and continuous occupation in another sphere, had I not been able to avail myself of the assistance of Dr. RAYMOND, whose thorough acquaintance with a large portion of the field I was attempting to cover, and whose ready comprehension of the nature of my plan, enabled him to render me a service so essential that I cannot consent to omit an explicit recognition of it.

Mining enterprises were among the motive powers to the exploration, conquest, and colonization of the New World. The desire to find a shorter route to the profitable trade of India, the desire to conquer new territory, wherever it might be found, in the name of some Catholic or Protestant sovereign of Europe, were accompanied, both in North and South America, by eager hopes of the discovery of gold and silver.

The history of the plunder of the metallic wealth and the development of the mineral resources of Mexico and South America, does not lie within my present purpose. The early enterprises of this kind in the Northern part of the continent were less successful, though the progress of two hundred years has made them more beneficial to national prosperity, for reasons which I shall, perhaps, be able to indicate.

Gold was found in moderate quantities in use among the Indian tribes of the present Southern States. The Spaniards under De Soto, following this clue, and led on by stories, exaggerated or misunderstood, of their Indian guides, made a wide superficial exploration in search of the origin of this treasure. They are supposed to have excavated many of the diggings in North and South Carolina and Georgia, which are now overgrown with forests. But no rich deposits appear to have been discovered, and no permanent operations undertaken.

In the Great Charter of King James, by which, in 1606, the right to explore and settle the North American Continent from the 34th to the 45th parallel, was granted to the London and Plymouth Companies, it was provided that one-fifth of the gold and silver, and one-fifteenth of the copper, which might be discovered, should belong to the crown. One of the earliest expeditions of Capt. JOHN SMITH in Virginia, was the exploration of the Chickahominy River, in the hope that it might constitute a water-way to the Pacific Ocean; and one of the next events in the history of the same colony, was a mining excitement, such as would be called in our California tongue, a "stampede," caused by the supposed discovery of gold—in which, fortunately, JOHN SMITH did not avail himself of his official position to take "stock." It is a curious circumstance that gold really occurs in that region, though the glittering dust, of which a ship-load was sent by the deluded colonists to the jewelers of London, proved to be but mica or iron-pyrites; and it seems probable (albeit this suggestion is not based upon any explicit record known to me) that the presence of gold among the Indians, and the discovery of specimens of the quartz or slates of Virginia, containing visible particles of it, gave rise to the general excitement, under the influence of which, without further tests of value, a large amount of worthless material was collected, to the neglect of necessary and profitable industry. From this point of view, the Jamestown mining fever was the prototype of many that have since occurred—all of which may be summed up in the general expression, that the mine "did not pan out according to the samples."

A more promising industry was inaugurated at the same time, by the sending of a quantity of iron ore from Jamestown to England, in 1608. This ore, smelted in England, yielded seventeen tons of metal—probably the first pig-iron ever made from North American ore. In 1620, a hundred and fifty skilled workmen were sent to the colony, to erect iron-works; and it is said that a fund subscribed for the education of the colonists and Indians, was invested in this enterprise, as a safe and sure means of increase. But in 1622 an Indian massacre broke up the enterprise; and both the manufacture of iron and the education of citizens and Indians have been obliged, ever since, to rely upon other sources of support.

For an interesting collection of facts relative to the beginnings of the iron industry of the American colonies, I refer you to the forthcoming work on that subject, by our fellow-member, Mr. JOHN B. PEARSE, to whose courtesy I am indebted for the opportunity to consult the advance sheets of a portion of the book.

According to the statement of Col. SPOTSWOOD, quoted by Mr. PEARSE, it appears that previous to 1724, neither New England, Pennsylvania, nor Virginia possessed blast furnaces. Their product of iron was from bloomeries only. According to Prof. HODGE, quoted by Prof. WHITNEY, however, a furnace was built at Pembroke, Mass., in 1702; and another authority states that in 1721, New England possessed 6 furnaces and 19 forges. In 1719 was passed the famous resolution of the British House of Commons, "that the erection of manufactories in the colonies tended to lessen their dependency on Great Britain." Only the earnest protest of the colonial agents prevented the prohibition at that time of the American iron manufacture. The next thirty years witnessed two instructive contests. The first was that of the colonial with the domestic pig-iron manufacture—a competition in which America was favored by the abundance of her vegetable fuel (the employment of mineral coal in iron-making, not having yet found introduction), in comparison with the rapidly waning forests of Great Britain. The British manufacture being protected by heavy duties on colonial pig-iron, the latter began to be more and more worked up into bar-iron, nails, steel, etc., at home; and this brought on a new competition with the British manufacturers of these articles. In 1750, a further legislative attempt to regulate this trade was made by Parliament, which decreed the admission of colonial pig-iron, duty free, but prohibited the erection in America of slitting, rolling, or plating mills, or steel furnaces, ordering that all new ones thereafter built should be suppressed as "nuisances."

It will be recollected that arbitrary acts of this kind, for the destruction of our infant manufactures, were among the grievances cited in the Declaration of Independence. The extent of the American iron manufacture, during the ante-Revolutionary period can be inferred only from scanty records of exports. These, beginning in 1717 with 3 tons, had increased, in 1750, to about 3,000 tons; in 1765, the total is reported at 4,342 tons, and in 1771, at 7,525 tons—the maximum annual export. The outbreak of the war of course put an end to exportation and caused a great demand for war-material, which occupied and rapidly extended the means of manufacture possessed by the country. The expanded iron industry suffered a severe collapse when, at the close of the war, not only this demand ceased, but the re-opened ports admitted large quantities of foreign iron—the successful employment of mineral coal, the steam-engine and puddling having by that time laid the foundation of English supremacy in the iron-manufacture.

The earliest copper mining company of which we find any record—according to Prof. WHITNEY, in his excellent work on the Metallic Wealth of the United States, the earliest incorporated mining company of any kind—was chartered in 1709 to work the Simsbury mines, at Granby, Conn. These mines were abandoned in the middle of the eighteenth century, afterwards bought by the State of Connecticut, and used as a prison for sixty years. Mining was resumed in them about 1830, and after a few years they were again abandoned. The ores were mostly shipped to England, and seem to have been lean. The deposit belongs to the class of irregular bunches, nodules, seams, or limited beds, in the New Red Sandstone, near its junction with trap. This formation was the scene in New Jersey, also, of early mining activity. The Schuyler Mine, near Belleville, on the Passaic, was discovered about 1719, and proved more profitable to its owners before the Revolution than it ever has been, since that time, to any of the series of individuals and companies that have expended large sums

in its development. In fact, the chief blessing conferred upon mankind by the Schuyler Mine arises from the circumstance that the first steam engine ever built wholly in America was constructed in 1793–4, at the small machine shop attached to the smelting works at Belleville, my father being the pattern maker in the party of mechanics sent out by BOULTON & WATT for the purpose of erecting an engine for the Philadelphia Water Works in Centre Square. In 1751 a copper mine was opened near New Brunswick; and the Bridgewater Mine, near Somerville, was operated previous to the Revolution, though even then, it is said, with much loss of capital. New Jersey's record in copper-mining is not a cheerful one; but her unsurpassed ranges of iron ores may well console her. Betrayed by the treachery of Triassic and trap, she can flee to the shelter of the crystalline schists. Pennsylvania was not without her copper mining in the colonial period, the Gap Mine, in Lancaster County, having been opened in 1732.

Already during the colonial period the first red gleams of the future glory of the Lake Superior mines had appeared. The intrepid Jesuit fathers, MARQUETTE and others, who penetrated the wilderness from Acadia to the Gulf, to carry both the Cross of their religion and the Lilies of their Sovereign, had made extensive explorations on the Upper Peninsula, and published glowing accounts of the abundance of copper, to which later travelers added legends of gold and precious stones. Before them, the Indian tribes, whose stone tools now furnish subjects of inquiry to the archeologist, had wrought rudely upon the deposits which nature had left in a condition so exceptionally pure as not to need, for the production of limited amounts of metal, the intervention of metallurgical processes. The first recorded mining operations on the part of white men were those of ALEXANDER HENRY near the Forks of the Ontonagon, in 1771. As is well known, however, the active development of this region dates from the publication of HOUGHTON'S "Geological Report," in 1841, and the extinguishment of the Chippewa title by the treaty of 1843.

Lead mining in this country may also claim an ancient origin—as we reckon antiquity. As early as 1651, Gov. JOHN WINTHROP received his famous license to work any mines of "lead, copper, or tin, or any minerals; as antimony, vitriol, black-lead, alum, salt, salt-springs, or any other the like," and "to enjoy forever said mines, with the lands, woods, timber, and water within two or three miles of said mines." As he received also a special grant of mines or minerals in the neighborhood of Middletown, Conn., it is not unlikely that the old Middletown silver-lead mine, the date of the discovery of which is not precisely known, was opened by him or his successors. The nickel and cobalt mines near Chester, in Connecticut, once held to be very promising deposits, are also believed to have been originally worked by Gov. WINTHROP; but nickel was not valuable in those days; and the lead and copper in these ores do not seem to have been abundant. Unfortunately, now that nickel and cobalt are so valuable as to repay amply the cost of extracting them, when they are present in a small percentage only, these Connecticut ores no longer correspond (if indeed they ever did) to the analyses and accounts formerly given as to their niccoliferous character.

The old Southampton silver-lead mine, in Massachusetts, well known to mineralogists, was commenced in 1765, by Connecticut adventurers; but its operations were suspended by the Revolutionary war. Lead mines in Columbia and Dutchess Counties, N. Y., were also worked at an early period; and, no doubt, all over the country occupied or controlled during the war by the American forces, there were small and desultory surface-operations, furnishing lead for the use of the army.

The Indians inhabiting the Mississippi Valley before the advent of the whites probably did not understand the metallurgy of lead. Galena has been found in the Western mounds; but, it is said, no lead. In 1700 and 1701 Père LE SUEUR made his famous voyage up the Mississippi, discovering as he claimed, many lead mines. Lead mining was begun in Missouri in 1720, while that country belonged to France, and under the patent granted to LAW'S famous Mississippi Company. Mine la Motte, named after a mineralogist who came over with RENAULT, the superintendent, was one of the first discoveries. It has been in operation at intervals ever since, and is now successfully managed by Mr. COGSWELL, a member of our Institute, who may, I think, truthfully claim that he has charge of the oldest mining enterprise still active in the United States. The ores yield a small percentage of nickel and cobalt, as well as lead.

It was in 1788 that DUBUQUE obtained from the Indians the grant under which he mined until the year of his death, where the city now stands which bears his name. The land was subsequently ceded to the United States by the Indians, and the representatives of DUBUQUE were forcibly ejected.

Such, then, was the condition of our mining industry at the commencement of our national existence. We occupied but a strip of territory on the Atlantic; and even in that limited area we had scarcely learned the nature and extent of the mineral resources to be utilized. Anthracite and petroleum, quicksilver and zinc, were unknown as treasures within our reach. The rapid extension of possession, government, population and industry over plains and mountains to the Pacific, which has been effected in a hundred years, is but the type of a conquest and progress which has advanced with equal rapidity in every department of human labor, and nowhere more notably than in the departments of mining and metallurgy. The tables which Dr. RAYMOND has prepared, and which will be printed to accompany these remarks, show that this country has produced during the century ending with 1875, of gold, about 66,680,000 troy ounces, worth about $1,332,700,000; of silver, about 201,300,000 troy ounces, worth about $261,450,000; of quicksilver, 840,000 flasks, or 64,206,000 pounds avoirdupois; of copper, 200,000 tons; of lead, 855,000 tons; of pig iron, 40,000,000 tons; of anthracite coal, 351,521,423 tons (the ton in all these cases being 2,240 pounds avoirdupois); and of petroleum, 76,594,600 barrels. The product of these leading industries for the year 1875 were: gold, $33,400,000; silver, $41,400,000; quicksilver, 53,706 flasks; copper, 15,625 tons; lead, 53,000 tons; pig iron, 2,108,554 tons; zinc, about 15,000 tons; anthracite, 20,643,509 tons; bituminous coal, about 26,000 tons; petroleum 8,787,506 barrels.

In order that a clear idea may be formed as to the relative position now held by the United States in the world of mining and metallurgy, I have selected the production of coal, which is the main reliance for power of all organized industry, and of iron, which is the chief agent of civilization, as the basis of comparison with other nations, using, so far as coal is concerned, the figures given in the 42d Annual Report of the Philadelphia Board of Trade, for the year 1873.*

	Tons.	Per cent.
Great Britain	127,016,747	46·4
United States	50,512 000	18·4
Germany	45,335,741	16·5
France	17,400,000	6·4
Belgium	17,000 000	6 2
Austria and Hungary	11,000,000	4·0
Russia	1,200,000	0·5
Spain	570,000	0·2
Portugal	18,000	—
Nova Scotia	1,051,567	0·4
Australia	1,000,000	0·4
India	500,000	0·2
Other countries	1,000,000	0·4
Total	273,704,055	100·0

The following estimate, in round numbers, of the world's present production of iron is taken from various sources, and may be considered approximately correct. The figures for Great Britain and France are those of 1874, and the product of the United States for the same year has been taken. For other countries the estimates are principally for 1871 or 1872, except Austria and Hungary, for which the official returns for 1873 have been taken.

The quantities are given in tons of 2,240 lb.

		Per cent.
Great Britain	5,991,000	45·2
United States	2,401 000	18·1
Germany	1,600,000	12·1
France	1,360,000	10·3
Belgium	570,000	4·3
Austria and Hungary	365,000	2·7
Russia	360,000	2·7
Sweden and Norway	306,000	2·3
Italy	73 000	0·5
Spain	73,000	0·5
Switzerland	7,000	—
Canada	20,000	0·2
South America	50,000	0·4
Japan	9,000	0·1
Asia	40,000	0·3
Africa	25,000	0·2
Australia	10,000	0·1
	13,260,000	100·0

An examination of these tables will serve to show that in the products which measure the manufacturing industry of nations, Great Britain stands first and the United States second on the roll, and that there is a clear and almost identical relation between the product of coal and the product of iron. The United States now produces as much coal and iron as Great Britain yielded in 1850. We are thus gaining steadily and surely upon our great progenitor, and in the nature of things, as the population of this country grows, must, before another century rolls around, pass far beyond her possible limits of production, and become the first on the International list, because we have the greatest geographical extent, and our natural resources are upon so vast a scale that all the coal area of all the rest of the world would only occupy one-fourth of the space in which, within our borders, are stored up the reserves of future power.

In a hundred years, we have thus reached a point, at which for coal, iron, gold, silver, copper, lead, and zinc, we are independent of the world, with abundant capacity to supply as well our growing wants, as to export these blessings of civilization to other and less favored lands, as soon as our labor and our legislation are adjusted to the conditions which will enable us to compete in foreign markets. One hundred years ago we proclaimed our political independence, and we maintained it by force of arms; we are now in a position to proclaim our industrial and commercial independence, and maintain it by the force of peaceful agencies against friendly competition.

A striking view of this prosperous development is presented by the magnificent mineral collection under the charge of Prof. BLAKE, in the Government building at the neighboring Exposition—a collection which constitutes the first worthy National Museum of Mining and Metallurgy.

Never was a century of free government celebrated under such favorable conditions, never was free government so justified by the material results it has produced. But let us not conceal from ourselves the fact that mere growth in wealth, mere development in industry, mere increase in population are not the best evidences of national greatness; and unless our progress in art, learn-

* I wish to acknowledge for these and other figures relating to coal, my obligationd to Mr. R. P. ROTHWELL, who has freely placed at my disposal the very extensive anr elaborate compilations of statistics which are to form the basis of an exhaustive papes by his experienced hand on that subject.

ing, morals, and religion keeps pace with our material growth we have cause rather for humiliation than for glorification.

"Whatsoever things are true, whatsoever things are honest, whatsoever things are just, whatsoever things are pure, whatsoever things are lovely, whatsoever things are of good report" constitute the real glory of a nation, without which the magnificent material structure which in a century we have reared, will disappear "like the baseless fabric of a vision."

In a hundred years, as I have said, we have reached a point at which, for every one of the minerals and metals named, we are independent of the world, having the capacity to supply our own growing domestic demand, and also to export to foreign lands.

It is not my purpose to trace in detail the steps by which this degree of progress has been achieved. The narration of successive events alone, without any discussion of underlying causes and accompanying effects, would consume far more time than I could command. So far as the leading epochs of the history are concerned, I think they may be fairly summed up in the following mere catalogue:

1. First of all, must be named the erection in Philadelphia, in 1794, of the first steam-engine in America. We celebrate this year the Centennial anniversary of a greater power than the United States of America—a wider Revolution than our War of Independence. It was in 1776 that JAMES WATT presented to the world the perfected steam-engine, all the improvements of which since his day are not to be compared with those which he devised upon the rude machines of his predecessors. In one hundred years, the steam-engine has transformed the face of the world and affected to its remotest corners the condition of the human race. Few changes have been so profound; not one in history has been so rapid and amazing. With reference to the special subject now under consideration, if I were asked what elements had most to do with the swift progress of our country, I should answer, Freedom and the Steam-Engine. But deeper even than any organized declarations or outward forms of freedom lies the influence of the steam-engine, which has been from the day of its birth, in spite of laws and dynasties, and all accidents of history, the great emancipator of man.

2. *Gold Mining in the South.* Already JEFFERSON, in his "Notes on Virginia," mentioned the finding of a lump of gold, weighing 17 dwts., near the Rappahannock; and, about the beginning of this century, the famous Cabarrus nugget, weighing 28 pounds, was discovered at the Reed Mine, in North Carolina. But the great gold excitement in the South followed the discoveries in Georgia, from 1828 to 1830. The maximum of production (probably never more than $600,000 in any one year) was from 1828 to 1845, since which time it has declined to insignificance, though a few enterprises, both in hydraulic and quartz mining, are now actively prosecuted.

3. *The Opening of the Anthracite Coal-fields and the use of Anthracite in the Blast-furnace.* The first of these events practically dates from the year 1820, although some anthracite found its way to market much earlier, and the second from the year 1839. The latter was followed by the development of the vast anthracite iron industry, which has contributed so much to the prosperity of Pennsylvania. The connection between anthracite and civilization was long ago pointed out by Sir CHARLES LYELL, in connection with his visit to this country, when he observed in this State, and in this very city where we now stand, the strange phenomenon of a vast manufacturing population, dwelling in neat houses and able to keep themselves and their houses clean. This smokeless fuel is a great moral and æsthetic benefactor. It has also proved specially useful in metallurgy—one process at least, the American zinc-oxide manufacture, being impracticable without it, and in war no one will deny its superiority who remembers how our cruisers, burning anthracite, and hence not traceable at sea by their smoke, were able to spy and pursue the blockade-runners, whose thick clouds of escaping bituminous smoke betrayed them. A table of the production of anthracite is given herewith; and some further observations concerning its control and management will be appropriate under another head of my remarks.

4. *The Use of Raw Bituminous Coal in the Blast-furnace.* This was introduced in 1845.

5. *The Development of the Copper-mines of Lake Superior,* beginning in 1845, and increasing slowly but steadily to 1862, when about 8,000 tons of ingot copper were produced; then declining for some years, to recover in 1868 and 1869 its lost ground, and since the latter year, by reason of the great production of the Calumet and Hecla Mine, to attain an unprecedented yield. The tables of copper production for the United States, herewith given, show that our present product is not far from 16,000 tons, of which three-fourths must be credited to the Lake Superior mines.

6. *The Discovery of Gold in California,* in 1848—or, rather, its re-discovery; since it had previously been known to both the natives and the Jesuit missionaries and also to hunters and trappers. The wonderful direct and indirect results of this event have been too often the theme of orators, historians, and political economists to need a further description from me. Its direct result in the way of mining was the rapid exploration of the Western territories by eager prospectors, and the successive development of placer-mines in nearly all of them. It is difficult to fix the dates of these beginnings; but we may assume with sufficient accuracy that gold mining practically began in Oregon in 1852, in Arizona in 1858, in Colorado in 1859, in Idaho and Montana in 1860. With the completer exploration of the country, and the decline of the placer-mines, stampedes have grown less frequent and extensive than in the earlier days. There is scarcely any corner of the country left, except the Black Hills of Dakota, which has not been ransacked sufficiently to show whether it contains extensive and valuable placer-deposits; and those districts which present accumulations of gold in such a way as to offer returns immediately to labor without capital have been already overrun. The principal reliance of our gold-mining industry for the future must be quartz and hydraulic or deep gravel mines. These may be expected to maintain for years to come their present rate of production, if not to increase it. In the table of gold production, herewith given, there is, it is true, a falling off of late years; but this is to be attributed to the placer-mines.

7. *The Commencement, about* 1851, *of Regu'ar Mining Operations at the New Almaden Quicksilver Mine, in California.* The production of this metal in the United States has been thus far confined to the State of California; and it will be seen from the table of the production of the New Almaden Mine, that it has always furnished a large, though of late a waning, proportion of the grand total for the country.

8. The middle of the nineteenth century was crowded with important events in metallurgy and mining. It was in 1856 that Mr. BESSEMER read his paper at the Cheltenham meeting of the British Association for the Advancement of Science, which inaugurated for both continents the Age of Steel. Within sixty days after that event, an experimental Bessemer Converter was in readiness at the furnaces of COOPER & HEWITT at Phillipsburg, N. J. But the experiment was not carried far enough to demonstrate the value of the newly-proposed process; and it was left to the late JOHN A. GRISWOLD and his associates to introduce and perfect this wonderful method in the United States. I speak more briefly on this point than its far-reaching importance deserves; but in the presence of one whose acquaintance with it is so profound, and whose services in relation to it have been so brilliant as those of our honored President, Mr. HOLLEY, and of so many gentlemen as I see before me, who are worthily associated with him in its glorious history, I could afford to be silent altogether.

9. *The Commencement of the Hydraulic Mining Industry.* The position of the auriferous slates and quartz veins, on the west flank of the Sierra, with the precipitous mountains behind them, and the broad plain before, has favored exceptionally the formation of deep auriferous gravels, in which California far exceeds any other known region. And the same topographical features furnish the two other prime requisites of hydraulic mining, namely, an abundant supply of water and a sufficient grade of descent to permit the use of flumes and the escape of tailings. These advantages the keen-witted miners of the Pacific Coast were quick to make available; and I think we may set down the invention of hydraulic mining, which occurred, I believe, about 1853, as an epoch in the progress of American mining. It has given us an entirely new and original branch of the art, involving many ingenious hydrodynamic and hydrostatic contrivances; and it has certainly made possible the exploitation of thousands upon thousands of acres of auriferous gravel which could not have been profitably handled in any other way. The mountain torrents of the Sierra, caught on their way to the Pacific, have been forced to pause, and do the work of man. The same agencies that buried the gold among the clay and pebbles of the river beds, are now made to strip the covering from it and lay it bare again. The hydraulic mines produce, at present, not less than $10,000,000 or $12,000,000, annually; and many enterprises of this kind, which have been prosecuted through years of expensive preparation, and are now just beginning to touch their harvests of profit, will add henceforward to the product. I may mention, as an illustration, the extensive operations of the North Bloomfield and its two allied companies in California, which have expended in works $3,500,000, and will have six deep tunnels, aggregating over 20,000 feet, and canals supplying 100,000,000 gallons of water daily.

10. We must turn for a moment to the East again, to note the commencement of iron mining at Lake Superior, about the year 1856. The extraordinarily pure and rich ores of the Upper Peninsula of Michigan now find their way, to the extent of a million of tons per annum, in fleets of vessels across the lakes to Cleveland, and are thence distributed to the furnaces of Ohio and Pennsylvania. The similarly pure Missouri ores have built up in like manner their own market. The growth of the Lake Superior iron business is shown in the accompanying table.

11. The next great event in the history of American mining was the discovery in 1859 that the Comstock Lode was rich in silver. This opened an era of activity and speculation which has scarcely ceased since that time. Single districts have been subjected to fluctuating experiences, passing from the first enthusiasm through all the stages of hope to reaction and despair; but though the fortunes of each have risen and fallen, like the changing tide, it has nearly always been high water somewhere. Thus we have had a succession of favorites in the way of silver-mining districts, each one crowding its predecessor out of the public notice. Of these, the following list includes the most permanently productive: In Nevada, the Unionville, Reese River, Belmont, White Pine, Eureka, Esmeralda, and Pioche districts; in California, the argentiferous district of Inyo County; in Idaho, the Owyhee district; in Utah, the Cottonwood and Bingham districts; in Colorado, the silver districts of Clear Creek, Boulder, and Summit Counties, to which the latest favorite, the San Juan Region, may be added. I have named those localities in which mining industry is still active and flourishing. There is a longer and a sadder list, the funereal effect

of which I will not intrude upon this festive occasion. But it ought to be remarked, that the apparent failure and abandonment of many districts heretofore does not argue their lack of prospective value. It is, on the contrary, amazing that under the adverse conditions surrounding the industry of mining in regions "remote, unfriended, solitary"—though not "slow"—so many communities should have succeeded in taking permanent root. Too much is expected of this industry when it is required to supply the lack of labor, food, transportation, government, and the organized support which in settled societies all the trades and occupations give to each other. Pioneer work is full of peril and of waste; and in view of the wonderful results achieved by our pioneers in mining, it ill becomes us to sneer at the losses and failures which constitute the inevitable cost of such conquests. When the battle has been gloriously won, and the spoils of victory are ours, we do not greatly mourn over the number of bullets that may have been fired in vain.

But through all the vicissitudes of silver mining in other districts, the Comstock mines have maintained their place, an instance of rapid exploitation, and of aggregated wealth of production unexampled in history. Here, too, there have been intervals of failing hope; but a new *bonanza* has always made its appearance before the resources at hand were entirely exhausted; and we have seen extracted from the ores of this one vein, during the past fifteen years, the round sum of $200,000,000 in gold and silver. Dr. RAYMOND, in the table herewith given, assumes the product of gold to have been (on the authority of Mr. HAGUE) about 40 per cent. of the entire value. We have, therefore, from the Comstock mines during the period named, $80,000,000 gold, and $120,000,000 silver.

The swift development of these mines, and the active commencement, about the same time, of deep quartz mining operations in California led to a remarkable progress in mining machinery, and to the perfection of two distinctively American processes. I refer to the California stamp mill and amalgamation process for gold, and the Washoe pan-process for silver. Neither of these is so novel in principle as the hydraulic process of gold mining already mentioned; but both of them have received the peculiar impress of an ingenuity and mechanical skill, partly innate in our national character, and partly the product of the stern pressure of economic necessities. Into the fruitful field of further metallurgical improvements born of our Western mining industry—or adopted by it—such as the BLAKE rock-breaker, the Stetefeldt roasting-furnace, the Brückner cylinder, the Plattner chlorination, and many others less widely known, I cannot enter here. Our people have advanced in this line with headlong energy, and accomplished great results—at great expense. Much, undoubtedly, remains to be done; and it may be hoped that future progress will be equally rapid, but less costly. The introduction, three or four years ago, of the smelting processes of Europe for the treatment of the silver ores of the West, is a striking and encouraging instance of the quickness of our mining communities to seize upon the advantages of experience elsewhere, as soon as they are brought to notice. The ignorance which has led to many disasters in such enterprises, was not voluntary or obstinate. Give our people light, and they do not keep their eyes shut. I am assured that already the smelting works of the West present many features of interest and suggestiveness even to the eyes of our skillful colleagues from abroad.

12. I may be permitted, in closing this imperfect review, to refer to the great improvements in mining machinery, in rock-drilling, in explosives, in the use of gaseous fuel, in the construction and management of blast furnaces, puddling furnaces, rolling mills, and other branches of the iron manufacture, which have crowded upon us during the last ten years. It is impossible here to give even an enumeration of them which shall do them justice. They have been worthily commemorated in many papers before the Institute. With regard to one of them—the Martin process for the manufacture of open-hearth steel—I may speak with some personal satisfaction, since I had the privilege of introducing it into this country, after studying its merits in 1867 abroad. I am convinced that it has a great future, as the ally, if not the rival, of the Bessemer process.

Returning now to the contemplation of the general field over which we have passed, we may inquire what the Government of the United States has done, with regard to the mining industry. Other nations have elaborate mining codes and bureaus of administration. In comparison with these, the meagerness of our governmental supervision of mining is remarkable; yet, in view of the progress I have sketched, may it not be possible that our system has been on the whole the best for us? Certainly a complicated mining code like that of Spain and Mexico, whatever it may have brought to the coffers of the State, seems to have conferred, in centuries of operation, little benefit upon the people.

The common law of England is the foundation of our jurisprudence in this, as in so many other respects. According to that law, as laid down in a noted case in the reign of Elizabeth, all gold or silver ores belonged to the crown, whether in private or public lands; but any ores containing neither gold nor silver belonged to the proprietor of the soil. Apart from the claims of the crown, the property in minerals is, according to the common law, *prima facie* in the owner of the fee of the land, but the property in minerals, or the right to search for them, may be vested in other persons by alienation, prescription, or custom. Since the two latter rights require an origin beyond the time of legal memory, they are practically out of the question in this country. The crown right to the precious metals, as declared in the case referred to, was a survival or remainder of the royalty claimed in ancient times by the sovereign over all minerals. This sweeping claim, born of the despotisms of the Orient and made the subject of much conflict among emperors, feudal lords, and municipal authorities during the Middle Ages, dwindled at last till it covered only gold and silver. But it disappeared entirely from English America, for the simple reason that there was no private land ownership in this country, and the sovereign of England claimed, by right of discovery, soil and metals alike, barring only the Indian title, which it was his exclusive privilege (or that of his authorized representatives or grantees) to extinguish. After the Revolution, the United States succeeded to the rights of the British crown, and by the treaty of peace and the subsequent cessions by the different States of their colonial claims upon the public lands, the federal government became possessed of a vast domain over which, after extinguishing the Indian title, it had complete control. In the Territories subsequently acquired from France and Spain, the United States assumed the rights and obligations of those sovereigns; and this circumstance, particularly in the adjustment of Spanish mineral and agricultural grants, has caused some apparent variations from the general policy. But it is sufficiently accurate to say that at the present time, throughout the country, the owner of the fee, or the party who has obtained from him by lease or purchase the mineral right, has supreme control. The mining legislation of the United States, therefore, is simply a part of the administration of the public lands; and for this reason it is executed by the Commissioner of the General Land Office.

In 1807 an act was passed, relating primarily to the lead-bearing lands of Illinois. They were ordered to be reserved from sale, and leased to miners by the War department. The leases covered tracts at first three miles square (afterward reduced to one mile) and bound the lessee to work the mines with due diligence and return to the United States 6 per cent of all the ores raised. "No leases were issued under this law," says Prof. WHITNEY, "until 1822, and but a small quantity of lead was raised. previous to 1826, from which time the production began to increase rapidly. For a few years the rents were paid with tolerable regularity; but, after 1834, in consequence of the immense number of illegal entries of mineral land at the Wisconsin Land Office, the smelters and miners refused to make any further payments, and the Government was entirely unable to collect them. After much trouble and expense, it was, in 1847 finally concluded that the only way was to sell the mineral land, and do away with all reserves of lead or any other metal, since they had only been a source of embarrassment to the department."

Meanwhile, by a forced construction (afterwards declared invalid) of the same act, hundreds of leases were granted to speculators in the Lake Superior copper region, which was, from 1843 to 1846 the scene of wild and baseless excitement The bubble burst during the latter year; the issue of permits and leases was suspended as illegal, and the act of 1847, authorizing the sale of the mineral lands, and a geological survey of the district, laid the foundation of a more substantial prosperity.

This policy of selling the mineral lands has been that of the Government ever since. But it has necessarily been modified in the West by the peculiar circumstances under which that region has been settled. Before lands can be sold they must be surveyed; and before they can be sold as mineral lands, their mineral-bearing character must be ascertained. Our miners and explorers overran and occupied the Pacific Slope in advance of the public surveys. They built cities that were not shown on any map; they cut timber, turned watercourses, dug canals, tunneled mountains, bought and sold their rights to these improvements under laws established by themselves, and enforced by public sentiment only. For nearly twenty years the Government looked on, without asserting its dominant ownership of the public lands; and when by the acts of 1866, 1870, and 1872, and other minor enactments, a general system was created, it was necessary to recognize as far as possible the rights which had grown up by general consent, and to seek only to give to them certainty, practical uniformity, and reasonable limitations It is not my purpose to discuss in detail the mining laws of the United States, or to trace the curiously complicated origins of the local customs on which they are largely based. Suffice it to say that the system recognizes the English common law principle, that the mineral right passes with the fee to the lands; so that, in the words of the Commissioner (July 10, 1873) "all mineral deposits discovered upon land, after U. S. patent therefor has issued to a party claiming under the laws regulating the disposal of agricultural lands, pass with the patent, and the Land Office has no further jurisdiction in the premises."

But the principle is also recognized that the mineral right may be separated from the fee by the owner, whether he be an individual or the United States; and this principle is curiously applied in the form of patents for mining claims upon lodes, which, following the form of the possessory title, grant to the patentee the right to follow all veins, the top or apex of which lies within the exterior boundaries of his claim, downward to any depth, though they pass under the surface of the land adjoining.

As the size and the price per acre of the tracts sold under the agricultural laws are different from those to which the mining laws apply, and as, under the homestead law, a certain amount of agricultural land may be obtained without any payment, it is evident, that no known mineral deposits can be acquired under the agricultural laws; and this reservation is enforced both in the preliminary proceedings and in the patents finally issued under those laws.

With regard to the mineral lands, however, it is certain that the patent for a claim carries with it both the fee of the land and also a mineral right, though

not the same mineral right as is contemplated by the common law; since it is enlarged on the one hand by the permission to follow mineral deposits beneath the surface of adjoining land, and limited on the other hand by the operation of the same permission in favor of the adjoining owner. The latter limitation is incorporated in agricultural patents also, and may become operative whenever they adjoin mining patents.

Previous to the application for a patent, the law permits free exploration and mining upon the public lands to all citizens and those who have declared their intention to become such. The rights of this class of miners, under what is known as the possessory title, are regulated by local laws and customs, subject only to a few simple conditions, which the United States enforces upon all, and which chiefly concern the maximum size of individual claims, the definite character of their boundaries and landmarks, and a certain quantity of labor which must be bestowed upon them annually, in order to maintain possession. I will not pause to state the different features which these conditions present for lode and placer claims. It is sufficient to say that the miner, conforming to them, and thus maintaining his possessory title, may, after a certain expenditure, and upon due application, survey and advertisement, in the absence of any valid opposing claim, perfect his purchase from the Government, receive his patent, and be thereafter free from the necessity of performing any given annual amount of labor to hold his claim. There are features in the present law concerning the rights of prospecting tunnels which seem both obscure and unwise; and some serious questions remain to be settled as to the precise meaning of the law in these and other respects; but these we must pass by.

Looking at the legislation on this subject as a whole, we see that it is confined to one department—that of title. The whole system is devised to facilitate the purchase of the mines by citizens. They are freely permitted to work them experimentally, but it is made their interest to buy them. No inspection, no police regulation, no technical control, is exercised by the Government.

Turning to the State and Territorial Legislatures, we find that they have, in some cases, provided for inspecting mines, in the interest of the safety of workmen. Perhaps the best law of this kind is that of Pennsylvania, in which State the peculiar perils of coal-mining have forced the Legislature to take measures of protection. But we find nowhere such a technical control of mining as is exhibited in many European States, where the Government requires of the miner that he shall not waste wantonly or ignorantly the resources which, once exhausted, will never grow again. Our people waste as much as they like, and no one interferes. Admitting that this is an evil, it still remains a matter of doubt how far, under the circumstances of our particular case, the supervision of authority could remedy it. For my own part, though inclined to restrict as far as possible the functions of government, I am not disposed to say that for so great an end as the conservation of the mineral wealth of the country, it may not properly enforce some measures of economy, with as good right as it may forbid the reckless waste of timber or the slaughter of game out of season. But, in our nation, at least, governmental interference is the last resort, and a poor substitute for other causes, which, in the atmosphere of freedom and intelligence, ought to be effective. We are, perhaps, in our material career as a nation, like the young man who has "sown his wild oats," and now, by mature reflection and the lessons of experience, is likely to be better restrained than by the hand of parental authority.

Permit me, in drawing my remarks to a close, to suggest two agencies which seem to me to be co-operating already, and to open still wider future prospect, for the steady social and economical improvement of our mining and metallurgical industry.

The first of these is the spread of knowledge on these subjects throughout the country. Under this head we must recognize the great importance of that series of explorations of our great Western domain, which was recommended by Mr. LINCOLN, with sublime faith in the salvation of his country, in the midst of the civil war, and which has been, by the liberality of the Government, prosecuted under various departments ever since. I need hardly make special mention, in addition, of the reports of the Commissioner of Mining Statistics, which have appeared annually since 1866, and have reflected upon our own community the light of the gathered technical knowledge of the world, while they have in turn exhibited to the world the resources and the progress of America. Such works as these, together with the technical periodicals and the occasional volumes, translated or original, which have come from the American press, have contributed already a great deal to the education of our mining communities. The government has not done too much in this direction; but it seems to me that it should continue this most necessary and proper work in a more systematic and uniform way. There ought to be no conflict of authorities, no duplication of work, no unnecessary expenditure of labor and money in the face of a task so great.

Next in order, I may rank the influence of the technical schools. The number of these has rapidly increased during the past ten years; and I venture to say that many of them compare favorably, in theoretical instruction at least, and several of them in the apparatus of instruction, with the famous schools of the old world. The Massachusetts Institute of Technology, at Boston; the School of Mines of Columbia College, at New York; the Sheffield Scientific School of Yale College, at New Haven; the Stevens Institute of Technology, at Hoboken; the Pardee Scientific Department of Lafayette College, at Easton; the excellent school at Rutgers College, under the direction of Prof. COOK; the new Scientific department of the College of New Jersey; the School of Mining and Metallurgy of Lehigh University, at Bethlehem; the School of Mining and Practical Geology of Harvard University, at Cambridge; the Scientific Department of the University of Pennsylvania, in this city; the School of Mines of Michigan University, at Ann Arbor; the Missouri School of Mines and Metallurgy, at Rolla; the Polytechnic Department of Washington University at St. Louis; and the similar department of the University of California, at Oakland; and perhaps some others which I have omitted to name—this is a list of schools for instruction in the sciences involved in mining and metallurgical practice, of which we need not be ashamed. What our schools undoubtedly need, is a more intimate relation with practice. But this theme I need not touch. It has been ably and amply discussed at the joint meeting last night of the two bodies most fully aware of all its bearings.

One more agency of the spread of technical knowledge deserves special mention. I refer to the influence of societies like the Institute of Mining Engineers. The five years' activity of this Institute has impressed upon the professions which it represents a spirit of union, an enthusiasm of progress, a mutual recognition of the claims of theory and practice, which cannot be too highly estimated. Perfect our schools as much as we may, the association of the young engineer with experienced engineers, the contact of his mind with mature minds, their recognition of his merit, their correction of his errors, constitute the necessary supplement to the school-training. The average man, at least, should not be left to wrestle with his professional career alone. He will make better progress and take more pleasure in it, if he calls to his aid the element of social sympathy, and the intellectual reinforcement expressed in the proverb, "many heads are better than one."

One further consideration, and I have done. The effect of growing intelligence and knowledge in improving our methods of industry would come short of some great ends if it operated only through the self-interest of the individual. Many reforms are beyond the power of the individual; some are not even to his interest. Thus the miner under a possessory title on a gold-bearing quartz vein in Colorado may know that with a greater investment of capital he could manage to reduce his losses of gold in extraction; but the capital may be wanting; or, he may know that by robbing the mine of its richest ores only, and allowing it to cave, he is probably destroying more valuable resources than he utilizes; but the mine is only temporarily his, and he prefers quick gains to permanent ones. So long as the anthracite lands of Pennsylvania were leased to countless small operators, who paid royalty only, on the coal which they sent to market, it was useless to explain to them that they wasted a third of the coal in the ground, and another third in the breaker, or that they ruined thousands of acres of coal beds, overlying those which they recklessly worked. If there were no natural remedy for this wicked waste of the reserved force upon which the future prosperity and comfort of mankind depend, it would be the highest duty of Government promptly to take into its own hands the direction, and management of the mines of coal which society holds in trust for the future: but already it is easy to detect the operation of a new social law developed within the memory of man, but the fruit of the preparation of the ages during which society has been slowly built up, and matured into its present form and conditions.

To the philosophic observer, the controlling law which runs through the whole history of man, down to the present century, is the law of dispersion, diffusion, distribution, the centrifugal social force, so to speak, which by its irresistible power has tended not merely to scatter mankind over the face of the habitable globe, but through what are termed civilizing and Christianizing agencies to place communities and individuals upon the common plane of equal rights in the domain of nature and before the law.

From the time of the confusion of tongues at the Tower of Babel, through the long history of the early Oriental Empires, which reduced society to the rule of order and then broke up into fragmentary political organizations, retaining, nevertheless, the principles of cohesion acquired by bitter experience; through the Greek and Roman imperial political structures upon which were engrafted the civilization and the religion which their downfall made the common heritage of the northern barbarians who came for destruction, but were themselves transformed into the apostles of a more liberal and enlightened social organization, this law of dispersion has never ceased to exercise its power and its supremacy. The very inventions of man are only so many proofs of the unceasing operation of this law. In warfare, gunpowder and fire-arms merely enlarged the area over which it was possible to carry on military operations; the magnetic compass only widened the field of commerce; the printing-press and the telegraph are merely agencies for the diffusion of thought; the steam-engine is but a means whereby it becomes possible to establish local industries in every part of the habitable globe; and the canal and the railway are essentially distributers of the products and the wealth of the human race.

Although there is an impression abroad that this age is one of growing concentration of property, no man can study the history and the facts of the development of society without coming to the conclusion that at no period has there been so general and equal a distribution of rights and property as in the present age. The destruction of the Feudal system was, in reality, the establishment of a new and better theory, in regard to the ownership of land, which has borne its legitimate fruits in the subdivision of estates in France, through the convulsions of a revolution; in the more general distribution of landed property in Germany, and in that steady, remarkable, and successful agitation

in England, which is now showing its results in the limitation of entail, the simplification of transfer, the enlargement of the suffrage, and the acquisition of small freeholds, whereby political power is being slowly but surely transferred from the great landholders to the middle classes of the most powerful and compact political organization which the world has ever seen.

While then there is thus an unmistakable progress in the world towards a juster and more general distribution of the control of the resources of nature and of the fruits of human industry, the present century has, undoubtedly, developed a new and remarkable centralizing tendency, which might be denominated the centripetal industrial force. I speak of the application of the corporate principle to the management of industrial enterprises, producing a concentration of property and management through the diffusion of ownership. Under the corporate system, the number of owners may be unlimited, but the management is necessarily confined to a few hands. It is the political idea of representation applied to industrial enterprises; it is the common wealth in its industrial, and not its political sense, which is concentrated for the material wants and progress of the human race. Now, this law of universal ownership, under limited management, heretofore applied with marked success during the latter half of the present century to great manufacturing establishments in this country, and of late in Europe, and, of necessity, to railroads everywhere, has at length, by slow but irresistible steps, taken possession of the great mining enterprises of the United States, and, to-day, has its strongest and most interesting development in the Anthracite coal region, which may be said to be monopolized by six great corporations, administered by a very small number of able officers representing a vast body of owners who rely upon steady but not excessive dividends for their support. It is the fashion to denounce these corporations as monopolizers, but it is only the thoughtless who do not investigate below the surface, who take this view of what is really the most interesting and suggestive application in our day of a powerful and irresistible force originating in the very heart of the social fabric. The monopoly is not the monopoly of ownership, for everybody is free to buy and sell, and there is no day when a man with money may not, at its value, procure a share in these enterprises. And no one familiar with business will pretend that the profits have been out of proportion to the cost and the risk of the undertakings, and no more conclusive answer, to any complaint on the score of monopoly can be made, than that to-day the shares in these corporations, in many cases, are selling below the original money cost. These corporations are, in fact, not the creators, but the out-growth of a new and beneficent principle, which has begun to assert itself in society, and will continue to grow in power until the end of time. This principle is the practical association of diffused capital, through the agency of corporate organization, with labor, for the promotion of economy, for the improvement of processes, and for the general welfare of mankind.

The capital is derived from innumerable sources, just as the little rills, finally, through streams and rivers constitute the great ocean. The laborer himself may thus be the capitalist, and the capitalist may thus be the laborer, each taking his share of that portion of the fund which is appropriated to labor and to capital, and often in a double capacity taking a share from both.

In its perfect and ultimate development it embodies the Christian idea of "having all things in common," yet "rendering unto CÆSAR the things that are CÆSAR'S."

The rate of profit which may be derived from these great enterprises, subject as they are to the scrutiny, criticism, and judgment of the public, in an age when nothing escapes notice, and all rights and property are virtually subordinated to the popular will, can never be excessive, for two reasons: on the one side the public will inevitably demand lower prices for an article of primary consequence in every household, and these corporations, creatures of the public will, as they are, could not successfully resist such a demand, based upon excessive or unreasonable profits. On the other hand, whenever the dividends rise above a reasonable rate of compensation, the laborers engaged in the production of coal, from whom these profits cannot be concealed, will justly claim, and rightfully secure, a larger share of the fruits of their labor The checks upon any unreasonable exercise of the power conferred by the own ership under limited management of the anthracite coalfields, are in reality so powerful, that the public have nothing to fear from this cause, but the corporations have rather reason to dread that they may not have justice at the hands of the public and the working classes. This justice they can only hope to secure by the wisest, best, and most economical management and administration of the property they control, and whatever profits they may hereafter derive and be allowed to divide among the owners, will be rather due to the economies which they may be able to introduce, whereby the article is furnished at the lowest possible rate, than to any fancied monopoly which they may have in the coal itself, or in its transportation to market.

Already, by the application of adequate capital, guided by the largest experience, and the highest technical skill, the Anthracite coal mines from being worked in a wasteful and extravagant manner, are being rapidly put in the best possible shape for the economical delivery of coal at the surface, and for the preservation of every portion of the store upon which the future value of the property must depend. But besides economy in mining, and care in preserving, there must be regularity and stability in the operations of the mine. There can be no real profit where these operations are subject to constant interruption, caused by strikes or other artificial impediments. The loss of interest on the plant at the mines, and in the lines of transportation caused by any serious stoppage to the works, would, of itself, be sufficient to render investments of this kind unprofitable. Hence the out-put must be regulated and proportioned to the wants of the market. But this regulation must be continuous and not spasmodic. To enable this to be done, large stocks of coal must necessarily be kept on hand, in order that any sudden demand may be properly met without any serious increase in price; and in dull times the accumulation and restoration of the stocks will give steady employment to the miners, to whose families any cessation of work is a calamity of the most serious character, and to society an unmitigated evil. To insure continuous operations, the best relations must exist between the corporate owners and the laborers in their employ. It is notorious that throughout the coal regions these relations have been of the most unsatisfactory character, resulting, at often-recurring intervals, in strikes and lock-outs, which have no redeeming feature, but, on the contrary, have raised the price of coal to the consumer, have impaired the dividends of the owners, and have reduced the working-men and their families to a condition of suffering and demoralization, appalling to every well-wisher of his race. It is fortunate, therefore, that the interests of all classes concur in the prevention of these destructive and demoralizing collisions, and that the owners of the property, for their own self-protection, will be driven to remove the causes which have produced them. It is idle for them to expend their capital for the best machinery, for the highest skill, for the most economical transportation, unless they can, at the same time, insure a continuous production from a contented laboring population.

This they have it in their power to do. If the same spirit of sacrifice which has sent out our missionaries into every heathen land, had been shown in the coal regions, and the same efforts had been made to establish and maintain the school house, the church, and above all the Sunday-school, which have borne such fruits elsewhere in this broad land; if the hospital for the sick, and the comfortable refuge for the unfortunate had been carefully provided; if reading-rooms and night-schools, and rational places of amusement had, from the outset, been maintained for a growing and restless population, the coal regions to-day might have been a paradise upon earth instead of a disgrace to civilization. And here it is that this new power of concentrated management can exert itself with sure and absolute success. The appropriation of a few cents per ton on the coal mined, to the work of improving the moral and intellectual conditions of the miners and their families, will, in a time incredibly short, change the whole face of society in the coal regions.

To be effective, however, this consecration of a fixed amount on each ton of coal sent to market must be as absolute and final as that portion of the proceeds which is devoted to pumping the mines, or driving the gangways. It must not come from grace, but from a sense of duty involved in the ownership of proper y, and dictated by a wise regard for its preservation and permanent value. Even if this percentage were added to the price of the coal the addition would not be grudged by the public; but in fact no such addition could possibly occur, as there is no surer way of promoting economy in the cost of production than by improving the social condition, the self-respect, and the intelligence of those who are engaged in the work of production, which thus becomes continuous and systematic. Until the great companies thus recognize the duties, the responsibilities, and the opportunities for good, which are offered by the new social development which has rendered their existence a necessity as well as a possibility, they must not complain that they are regarded with distrust, and as enemies, both by the public which consumes their products, and by the working classes who see in them only grasping employers without a conscience. What individual owners could not do, it is easy for these great companies to put in practice; but the effort must be as earnest and serious, as is the business of producing the coal and getting it to market. The very best talent must be secured for the organization and management of the various agencies necessary for the moral, intellectual, and social improvement of the working classes, who must be themselves associated in the administration of the fund created and expended for their benefit. Five cents per ton would produce an annual revenue of over $1,000,000 applicable to this necessary and noble use, and five years of its intelligent and conscientious administration would convert what in some regions has been aptly termed a "hell upon earth" into a terrestrial paradise which would be the pride and the glory of the new world.

What more fitting celebration of the Centennial year of American Independence could be possibly suggested or devised, or how could the advent of the incoming century be better signalized, than by the foundation on the part of the great Anthracite Coal Companies, of a new department in their administration, for the moral, mental, social, and physical improvement of the working-men and their families, and by the appropriation of a fixed charge on coal for this purpose. Let each of them select a well paid and competent agent to devote himself to this work; let the various agencies be wisely organized and surely perfected, and there will be realized one of the greatest triumphs of that gospel which proclaimed "Peace on earth, and good will towards men." The example thus set will soon extend itself to other industries, and to every branch of business which can adapt the corporate principle of the concentration of management through diffusion of ownership, the result of which will be that the strange phenomenon, now felt throughout the civilized world, of a general glut of products in the face of general want of them, will never again be witnessed; because, when the working classes, through the diviner agencies of Christian effort, shall have constant employment, and adequate compensation, the sure results of general enlightenment and a cultivated conscience in the use of property, the power of consumption, now so far in arrear, will surely overtake the power of production, and re-establish the equation which nature intended to subsist between them. Thus may be realized that Christian Commonwealth which has been the dream of the patriot, the philanthropist, and the statesman, in all ages, in which every man who is willing to work shall find employment, and in which the products of industry will be so distributed that every man shall feel that he has received his fair share of them; in which there will be neither abject and hopeless poverty on the one hand, nor superfluous riches on the other, because the problem of how to distribute capital through the concentration of management will have been fully solved and be thoroughly comprehended by all classes in the community; in which the quaint questions

put by Sir THOMAS MORE, three hundred and sixty years ago, will at length have been answered, and his suggestive commentary thereon have lost its significance:

"Is not that government both unjust and ungrateful, that is so prodigal of its favors to those that are called gentlemen or goldsmiths, or such others who are idle, or live either by flattery, or by contriving the arts of vain pleasure; and on the other hand takes no care of those of a meaner sort, such as ploughmen, colliers, and smiths, without whom it could not subsist?

"But after the public has reaped all the advantages of their service, and they come to be oppressed with age, sickness, and want, all their labors, and the good they have done is forgotten, and all the recompense given them is, that they are left to die in great misery. The richer sort are often endeavoring to bring the hire of laborers lower, not only by their fraudulent practices, but by the laws which they procure to be made to this effect, so that though it is a thing most unjust in itself to give such small rewards to those who deserve so well of the public, yet they have given those hardships the name and color of justice, by procuring laws to be made for regulating them."

Although I quote from the "Utopia" let it not be supposed that there is anything Utopian or impracticable in the proposition which I have advanced. It seems to me to be the next great step to be taken for the amelioration of the condition of mankind. The law of diffusion which thus far has governed the progress of the human race towards a higher and better plane of civilization, has at length made an effective lodgment in the domain of capital, whereby it is rendered capable of infinite division without impairing, but in effect improving the economy and force of its administration. The reproach that "corporations have no souls," must, and will, next be removed, so soon as the beneficent possibilities inherent in these agencies shall be generally recognized, and those who are called to the management shall see that because capital is aggregated, the primary law on which all property rests, that it is a trust to be administered for the public good, loses none of its force, but can, in reality, only assert itself in all its vigor when concentrated management is brought to bear upon great aggregations of capital. Man did not become a "living soul" until God breathed into him the breath of life. So corporations are mere machines until they are inspired by the associated conscience of society, to which they can give ready and effective expression, and I look for this expression first from the great coal companies, because their property and their peculiar organizations make it easy as well as profitable for them to put in practice the fundamental idea that a fixed portion of the proceeds of industry should be invariably devoted to the social improvement of those who labor directly for its development.

If the seed here dropped should take root, as I pray and believe it will, then indeed will the country and the world have reason to rejoice at the industrial development of the last hundred years, and the celebration of this Centennial be the dawn of a better day for the patient sons of toil, who, let it be confessed, with all frankness and humility, have not yet been endowed with their fair share of the good things of this goodly earth.

TABLE OF PRODUCTION OF LEADING METALS AND MINERALS IN THE UNITED STATES DURING THE FIRST CENTURY OF NATIONAL INDEPENDENCE

Prepared by R. W. Raymond.

	Anthracite, in tons of 2,240 lb. avoird.	Pig Iron, in tons of 2,240 lb. avoird.	Lead, in tons of 2,240 lb. avoird.	Copper, in tons of 2,240 lb. avoird.	Quicksilver, in fl'sks of 76½ lb. avoird.	Gold, in dollars, U. S. coin.	Silver, in dollars, U. S. coin.	Petrol'm, in barrels of 42 gals.
1819	18,000*							
1820	1,965							
1821	3,273							
1822	4,940							
1823	9,023							
1824	12,641	....	4,432*					
1825	38,499	....	1,281					
1826	54,815	....	1,771					
1827	71,167	2,178,239*	3,927					
1828	91,914	130,000	7,815					
1829	133,203	142,000	7,824					
1830	209,634	165,000	7,163					
1831	230,320	191,000	6,646					
1832	448,171	200,000	8,888					
1833	592,210	218,000	9,767					
1834	456,859	236,000	10,552					
1835	678,517	254,000	11,696					
1836	825,729	272,000	14,216					
1837	1,039,241	299,020	11,994					
1838	873,013	308,000	13,512					
1839	957,436	326,000	15,539					
1840	1,008,220	347,000	15,000					
1841	1,115,045	290,000	18,171					
1842	1,286,618	230,000	21,586					
1843	1,478,926	312,000	21,000					
1844	1,899,805	394,000	22,000	2,680*				
1845	2,352,984	486,000	26,500	100				
1846	2,707,321	765,000	25,000	150				
1847	3,327,155	820,000	25,000	300	....	20,000,000*		
1848	3,572,695	800,000	22,500	500	....	10,000,000		
1849	3,724,826	650,000	21,000	700	....	40,000,000		
1850	3,863,365	563,755	19,500	600	25,424*	50,000,000		
1851	5,190,690	413,000	16,500	800	24,000	55,000,000		
1852	5,725,148	540,755	14,000	1,000	20,000	60,000,000		
1853	5,940,905	723,214	15,000	1,850	19,000	65,000,000		
1854	6,846,556	662,216	14,000	2,250	27,000	60,000,000		
1855	7,684,542	700,159	14,000	3,000	33,000	55,000,000		
1856	7,999,767	788,515	14,000	4,000	30,000	55,000,000		
1857	7,694,842	712,643	14,000	4,800	28,000	55,000,000		
1858	7,864,239	629,552	14,000	5,500	31,000	50,000,000	1,000,000*	
1859	9,010,726	750,560	14,000	6,300	12,000	50,000,000	100,000	3,200
1860	9,807,118	821,223	14,000	7,200	10,000	46,000,000	150,000	650,000
1861	9,147,461	653,164	14,000	7,500	35,000	43,000,000	2,000,000	2,113,600
1862	9,026,211	702,912	14,000	9,000	42,000	39,200,000	4,500,000	3,056,666
1863	10,953,077	846,975	14,000	6,474	40,531	40,000,000	8,500,000	2,611,359
1864	11,631,400	1,013,837	14,000	6,518	47,489	46,100,000	11,000,000	2,116,182
1865	10,783,032	831,768	13,165	6,811	53,000	53,200,000	11,250,000	3,497,712
1866	14,233,919	1,200,199	14,342	6,978	46,550	53,500,000	10,000,000	3,597,527
1867	14,345,644	1,305,015	13,662	7,774	37,000	51,700,000	13,550,000	3,347,306
1868	15,810,466	1,431,250	14,636	9,467	37,000	48,000,000	12,000,000	3,715,741
1869	16,375,678	1,711,276	15,653	11,858	33,713	49,500,000	13,000,000	4,215,000
1870	17,819,700	1,696,429	15,922	12,650	29,546	50,000,000	16,000,000	5,659,000
1871	17,370,463	1,707,685	17,854	12,546	31,881	43,500,000	22,000,000	5,795,000
1872	22,032,265	2,539,783	23,106	11,948	30,306	36,000,000	25,750,000	6,539,103
1873	22,828,178	2,560,962	46,661	15,573	28,600	35,000,000	36,500,000	9,879,455
1874	21,667,386	2,401,261	53,219	17,548	34,254	39,600,000	32,800,000	10,910,303
1875	20,643,509	2,108,554	53,000	15,625	53,706	33,400,000	41,400,000	8,787,506
Total.	341,521,423	40,000,000	855,000	200,000	840,000	1,332,700,000	261,450,000	76,594,600

* Including the whole previous period from 1776.

COLORADO MINES.

Gold Shipments—A Favorable Showing—Mining Statements—Large Profits—Tons of Pure Silver for the Centennial Exhibition.

Special Correspondence of the Engineering and Mining Journal.

COLORADO will make a very creditable showing at the Centennial, in the handsome State building that she occupies jointly with Kansas. Besides the main attraction, the mineral collection, which will probably excel all others in the variety of its contents, and some very creditable agricultural and stock growing productions, a rare and very extensive combination of fossils, stuffed wild beasts and birds of the plains and mountains, and other curiosities will add not a little to the attractiveness of Colorado's exhibit. Among the liberal contributions from the great silver districts, is an 8,000 pound specimen from the Dives, and 4,000 pound lumps of ore from both the Pelican and Moose. All sections are well represented. The Tellurium districts send a very good collection, chiefly noticeable on account of its great value. Gilpin County has a varied assortment of many colors from its numberless mines, to which will be added three or four tons of pure silver bricks (999 fine), from the Boston and Colorado Smelting Works. Although less in quantity than that from the great Comstock of Nevada, it will probably be the handsomest silver on exhibition.

BULLION SHIPMENTS.

The books of the express company at Central, make the gold shipments for April and May as follows:

April.	Stamp mill gold	$118,170
	Gold from smelting works	61,000
May.	Stamp mill gold	113,550
	Gold from smelting works	21,000
		$313,720

In April, 1875, the stamp mill gold footed up $90,734.97, and $85,097.51 for May. But the gain is actually greater than is apparent here, from the fact that the express office figures do not represent the full amount. I will furnish the exact figures in due time. The gold from the smelting works is sent in the form of bricks, with from $16,000 to $22,000 each, which causes the disparity of some months over others. The yield of May would have been one-fourth larger, but for the heavy fall, and rapid disappearance of the great snows of May 21 and 22, which caused most mines to be very seriously troubled with water.

MINING NOTES.

Outside of this there is very little to report from most of the leading mines from what appeared in my last letter. The Bob Tail Mine is yielding more largely than ever, and the wood machine drills are fairly at work, and are doing good execution. The Fisk keeps the better part of a twenty-five stamp water mill busy, and its yield of from $4,000 to $6,000 per month has been largely increased. Sinking is carried on steadily in the 500-feet shaft on the Buell Mine through a fine body of ore, and the property will soon be producing its accustomed yield again of nearly $150,000 per annum. There is a prospect of an early resumption of work on a large scale on the Illinois, Gardner, and California. Small quantities of rich ore are mined from these lodes. A very good quality of ore is raised from a depth of 1,000 feet on the Ophir Burroughs. On the same lode some work is being done further east, and the entire vein, west to its union with the Kansas, is being developed by those operating in the latter lode.

THE KANSAS.

On the easterly portion of the Kansas, MEDCALFE & FAGAN have lately purchased 700 feet which had long been idle, owing to former mismanagement, together with 200 feet on the Water Mill Lode in Nevada Gulch, and the Hardesty 24-stamp mill near by. Sinking and drifting has been commenced with excellent results. At a depth of 360 feet the Kansas shaft is being driven through a splendid body of ore that bids fair to equal that of 1870–72. Four hundred feet of this property was owned by the HARDESTY Brothers, who, after sinking a 40-feet shaft without returns, allowed it to remain idle for ten years. In 1870 a party of leasers began work, and almost immediately came into an ore deposit of unusual value, which continued to improve for many months. There was a period of ninety days during the time of their lease, when $27,000 was received for smelting ore alone, and the mill returns were much larger. The mine was soon after sold to a company, and the leasers were paid $18,000 to throw up their lease. Up to 1873 the mine had yielded $166,000. Present indications point to an equally good record hereafter.

A half mile further west the University property that yielded $130,000 in 1871–72, and about $70,000 altogether at other times, is now worked on a small scale. West of this, FAGAN is obtaining valuable ore at a depth of 650 feet on what is known as the First National Kansas.

Adjoining this on the west, where the Burroughs and Camp Grove enter this vein, is 300 feet of territory that has been known as the Kas-Colorado or the Waterman. The Monmouth Company, which was organized one year ago on the adjoining 300 feet west, bought, and took possession of, this property, May 1, 1876, together with its great mill originally built for the worthless Crosby and Thompson process, but now containing 52 stamps. The Waterman (300 feet), while owned by J. C. FAGAN, yielded $127,766.74 in eighteen months ending June, 1875, with a profit of $47,000.

The Monmouth Company worked its *first* purchase by levels run west from the Waterman shaft, which was 613 feet deep, and struck pay in July, 1875. As intelligible mining statistics are usually somewhat difficult to obtain here, I give the following complete statement in full, as furnished by the company for ten months ending May 1:

1875.	Gross Product.	Expenses.	Net Profit.
July	$2,448.17	$1,649.71	$798.46
August	6,453.42	3,136.86	3,316.56
September	7,372.99	3,515.85	3,857.14
October	5,110.30	3,010.30	2,100.00
November	7,972.85	4,036.70	3 936.15
December	11,230.92	6,770.89	5,460.03
1876.			
January	8,921.85	4 611.39	4,310.46
February	7,273.37	5,258.46	2,014.91
March	7,675.00	5,439.54	2,235.46
April	5,979.91	3,225.11	2,754.80
	$70,438.78	$40,654,81	$30,783.97

The falling off of the last three months was caused by straightening, improving, and retimbering the main shaft and placing a powerful pump therein. Work has usually been suspended here on such occasions, but was not in this

case, although somewhat interrupted. Last month the yield approached $10,000, and hereafter double that amount will probably be obtained from the entire 600 feet. The 613-feet shaft is again being sunk. The same rich vein of ore extends from the 340-feet level down to the deepest workings, and an unknown distance below, and explorations west show it to continue through the West Kansas (490 feet) lately purchased by FAGAN. It is from three to four feet wide, and outside of the selected smelting ore, usually yields $17 per ton, but often thirty or forty. The Irish Flag and Mount Desert branches of the West Kansas have also been bought by the same party.

Here are altogether 5,000 feet of lodes on Quartz Hill controlled by one management that will hereafter give employment to nearly 200 men, four quartz mills with 131 stamps, with a probable monthly product of 3,000 tons of ore, and of perhaps $40,000. Nearly all of this property was idle for years previous to the resumption of work as narrated above.

THE GUNNELL.

The most remarkable yield known in this country for many years is that obtained on the western part of the Gunnell lode, and which comes from what is called the Grand Army property. KIMBER & Co. work the old Gunnell gold property which contains a 700-feet shaft. This ceased to pay till they ran levels west on the vein into the Grand Army at depths of 500 feet and over. They obtained therefrom $12,463.28 in January, and the receipts, expenses, and profits for the three months ending May 1 were as follows :

	Receipts.	Expenses.	Net Profits.
February	$16,700	$8,548	$8,152
March	25,630	10,121	15,509
April	24,645	9,445	15,200
	$66,975	$28,114	$38,861

Here is a yield of $50,275 in the months of March and April with a profit of $30,709, and these figures would have been much larger but for the difficulties with the owner of the Grand Army. With a mill directly over the mine, as is the case with the Gregory, Buell, Illinois, and Kansas, the profits would have been several thousand dollars greater. The ore vein is from 5 to 15 feet wide, and yields at the rate of from $15 to $25 per ton, besides quantities of rich smelting ore. The stamp mills have returned as high as $50 per ton, and the smelting ore $200.

J. C. FAGAN is sinking a shaft near the center of the Grand Army as rapidly as possible, so as to break into the workings and levels of KIMBER & Co., which are directly beneath, and has reached a depth of 340 feet. Nearly two months will be required to reach the ground broken above the 500-feet level, and when that locality is reached KIMBER & Co. will of course retire. It is stated by competent judges that the ore body below the 200-feet level cannot be exhausted in four years. The owner of this has also pre-empted 1,500 feet on the same lode still further west, which he calls the Fagan and a like distance on the Whiting (west) called the Wheeler, both of which are being developed and show rich ore. The east 2,500 feet of the Gunnell is controlled and mainly owned by JOHN SCUDDER, who is beginning to work it extensively. In this the old University, Coleman, and other properties are included.

MISCELLANEOUS.

On Gunnell Hill the St. Louis lode, whose great drawback has been refractory ore, is now, owing to improved milling, paying handsomely. In three months 100 cords, 800 tons, has yielded an average of $11 per ton. The vein has widened gradually to 9 feet at the bottom of the 260 feet shaft, where the ore is worth $20 a ton. Near by the Pleasant View, 250 feet deep, makes an equally good showing. The Sudeberg is paying well near the surface. Further west, on Gunnell Hill, the Hubert has, at last, become a paying mine. It is now turning out 35 tons of ten dollar ore for the stamp mills, while several tons, rich in lead and carrying considerable silver, are sold daily to the Golden smelting works. The Pyrenees lode is also selling the latter character of ore.

A company has recently been organized to drive a tunnel through Quartz Hill, 3,000 feet from the lower part of Nevada Gulch, near the Quartz Hill Tunnel, the most practicable location for an enterprise of this kind. It will cut a very large number of lodes already well known and, probably, many blind ones. Among the first will be the Fortune, owned by the tunnel company, at a depth of 320 feet, and further south the famous Burroughs, Roderick Dhu, and Illinois, at depths of from 500 to 600 feet. It is considered a grand undertaking in the way of exploration, drainage, and as an ore outlet, as well as a profitable scheme for the development of old and new lodes. The organization is known as the Central City Tunnel Company. It was formed, and its affairs are now superintended here by D. G. WILSON, one of the early owners on the Bob Tail, who, like many others, after many years' absence, has returned to remain in Colorado. The La Crosse Tunnel, a half mile further up the gulch, has cut one low grade ore-body 40 feet wide, which can be successfully handled as soon as the waters controlled by the Consolidated Ditch Company are flumed and brought down Nevada and Central. F.

CENTRAL, Colorado, June 15, 1876.

MINING NOTES FROM CALIFORNIA, MONTANA, NEW MEXICO, AND UTAH.

CALIFORNIA.—*Mining and Scientific Press*, June 10. *The Eagle Mill and Mining Co.* operates near the Grizzle Flat in El Dorado County. The lode, which is in granite, will average from five to six feet in width. Main shaft 240 feet, tunnel 475 feet, running along the lode at least 400 feet, reaching a depth from surface of 140 feet. Much good ore has been taken out of the mine in the past. It had lain idle several years, and operations were commenced again last December. The company are now running a prospecting tunnel, with the view of striking the chimneys found in the old tunnel, 100 feet deeper. In the meantime they are crushing rock from the upper tunnel at Mr. MOREY'S 5-stamp mill, which pays from $8 to $18 per ton. The company contemplate building a mill at an early day.

The Pleasant Quartz Mine has been worked steadily for the last 18 months. The tunnel, 370 feet in length, intersects the vein (which is at that point 11 feet in width), at a depth of 130 feet from the surface. The average width of lode is six feet. Drifts have been run north and south 120 feet, and the ore pays from $20 to $40 per ton. The 10-stamp mill below the mine is kept pounding away by day and night, run by a water hurdy gurdy wheel, pressure 340 feet. Eighteen men are employed. This mine was worked from 1868 to 1874, and a shaft 400 feet was sunk and much prospecting done during that time at a cost of about $60,000. Rich ore has at last been struck, and the mine is yielding a good harvest in return for the time, labor, and money previously spent. The sulphurets are worth $400 per ton. Free gold is plainly visible in much of the ore.

The Emigrant Mining Company, in Inyo County, own the Cactus, Valentine, Center, Philadelphia, Capitalist, Centennial, and Mountain View Mines ; they are nearly all situated upon the summit of a cactus *pampa* dividing the northern end of Panamint Valley from the slopes toward Big Lake, the altitude of which cannot be more than 5,500 feet above the sea. The country is chiefly lime—the ledges presenting all sorts of curious shapes, lying under the black scoria croopings. The Cactus seems to be an irregular body of extremely rich chloride ore, of an average width of five and one-half feet A recent inspection of the opening in this particular mine showed that it was not deeper than 15 feet, but of a length and breadth three or four times that. Some 250 tons of ore, the poorest of which will readily work $300 per ton, was on the dump. Of this class some specimens show the purest born silver, flecked with bunches of free gold. The Valentine, which is evidently a continuation of the same, and showing well for the permanency of both, is a nearly upright ledge, opened by shaft and incline to a depth of 60 feet, at the bottom of which some good ore is visible among the well-defined ledge matter. The company have nearly completed a steam five-stamp mill, situated at Zacaton Springs, some six miles distant. The company employ 20 men ; have never levied an assessment, the expenses so far having been mainly defrayed by shipments of rich ore to San Francisco. The other mines of the district bear the same general character, among which is the Mazeppa, a ledge producing the richest character of free chlorides.

The Soulsby Mine, Tuolumne County. The run of this mine for May was about 15 tons of ore per day, yielding over 1,200 ounces—at $17 per ounce, $20,400 gold. The amount was taken from the batteries only ; the dies and pans not being cleaned up, is not included. Neither does this include the sulphurets, saved in SCHOFIELD'S sulphuret concentrator. In 26 days 10 tons of sulphurets were saved, which the superintendent estimates will average $350 per ton, making $3,500 for the month ; besides this, $126 in gold amalgam, escaping from the battery, was caught in the first hopper of the concentrator, which, had it not been for this splendid machine, would have gone into the tailings pile.—*Amador Ledger.*

The Phœnix Mine, in Plymouth, is now yielding ore from the 900-feet level at the rate of 80 tons per day, which is all the mill is capable of crushing. The ore is rather low grade, running about $8 per ton. The monthly yield of gold reaches $20,000. About 80 men are engaged in the mine and mill, and over $10,000 is disbursed monthly for running expenses. The ore in this mine has varied from ten to sixty feet in thickness, the rock getting richer as depth is attained. The average width of the ledge is estimated at forty feet

A rich gravel-bearing ridge has been found one mile north of Volcano, Amador County.

Montreal Placer Claim.—The main channel is said to be 200 feet wide. About 20 small carloads from the 400-feet drift have been washed, and yielded at the rate of $1.50 per carload. The entire length of the tunnel is in dirt that prospects well, and will pay to work by the hydraulic process.

Mahoney Mine.—The work of taking out rock has commenced on this mine and the Lincoln Mill is now running to half its capacity in crushing the same.

The Gwin Mine, Calaveras County, progresses favorably, the bullion product being $1,500 per day. Sinking has been recommenced in order to be ready to run another level as soon as this is worked out.

The Abbott Quicksilver Mine for the month of May, shows: Number of days run, 28; amount of ore reduced, 386 tons; number of flasks, 171.

The Great Western Quicksilver Mine, in Napa County, is yielding 450 flasks of quicksilver per month. A new furnace, of the Livermore pattern, capable of reducing 25 tons per day, is being put up, and will be ready for use in about three months. The mine at present employs 165 men, and, the *Register* says, is one of the few mines in the district that can be worked with profit at the present low rate of quicksilver.

The Empire Coal Mine, in the vicinity of Antioch, Contra Costa County, recently shipped its first schooner load of coal from the Granger Wharf. The proprietors have contracted to furnish 150 tons daily. Some eighty men are employed at the mine, and fifteen six horse teams are required to transport the necessary amount of coal to the water front. The coal continues to be of excellent quality, and its success is assured. A railroad from the wharf to the mine is a necessity, and various other mines in the vicinity which will doubtless be opened within a few years will contribute to its support.

The Spencerville Copper Works, Yuba County, recently shipped in one week 22,400 pounds of copper. It is expected that the works will be able, with present facilities, to finish hereafter about ten tons per day. Of the above 700 pounds was bar copper worth twenty cents per pound, and 21,700 cement copper, worth eighteen cents per pound.

Colorado Coke Works.—The coke works at El Mora, near Trinidad, are reported a complete success producing coke of the finest quality.

MONTANA.—*Independent*, June 8th. *The Rumley's Silver Mine* in Jefferson County, is down 110 feet, and the lower level is 130 feet long. The width of ore vein the whole length of the lower level is six feet. About one-half of this is first class ore, and will average $175 per ton and 46 per cent. lead. The second class ore will average $62 per ton and 30 per cent. lead. They are now raising forty tons of first class ore per week with only one level to work from, and as yet they have done no stoping. It is the intention of the company to sink sixty feet deeper and run another level. This will double the capacity of the mine and obviate any inconvenience which may arise to obstruct work on the first level. At the close of the present season the company will erect reduction works and prepare for working the mine upon a much more extensive scale. They are now preparing to ship 1,000 tons of ore

The Spurr Lode, Butte Miner, June 6th. This lode, which is situated in what is known as the Summit Valley Mining District, was located in the summer of 1875, and in October of the same year the owners commenced sinking down and continued until they struck water, at a depth of 44 feet, and to this point almost from the surface the vein is well defined, having hard granite walls. The average width of vein is four feet, the narrowest part being something less than 3 feet, while in places it widens to nearly eight feet. It has yielded good pay ore from the surface, running from $100 to $700 to the ton. At the water level the vein is over the average width, but the ore is not as rich, averaging not more than $180 to the ton. The developments in the mine thus far consist in two shafts, one of 44 feet and the other of 23 in depth. These two shafts are connected by a level at the last mentioned depth, and extending west from the first shaft 40 feet, and from the second shaft east 30 feet, making altogether a level 140 feet in length. In accomplishing this work there has been taken out very nearly 300 tons of ore, and from this there has been from time to time assays made, on ore from each ton, giving as a result an average of $330 to the ton. The amount of ore in sight at this mine is variously estimated at from 2,000 to 3,000 tons. If taken at a valuation at an average of 25 per cent. less than the ore already raised to the surface, it will give over a half million dollars in sight. The operations are carried on by the owners exclusively (seven in number), and the lead is being systematically and economically worked. The returns after paying all expenses, including freight on ore to Salt Lake City ($40 per ton), give a handsome profit.

The Norwegian Ditch Hydraulic Claim is now running nicely, carrying from 600 to 800 inches of water—pressure measurement. The company is running two hydraulics, using eighteen-inch flumes. They have six flumes of this capacity in and are piping on banks of gravel from three to twelve feet deep. The Norwegian diggings are paying well. The first clean-up paid $15 per day to the hand, and there is ground enough of that kind to last for years.....*Boulder Ditch* broke on the 29th ult. and eighty feet of it washed out, which was repaired by putting in a flume. It delayed the Gold Hill miners from working about two days.....*The Consolidated Gregory*, is down 100 feet and turning out excellent ore.....*The Comet Mining Company* are erecting works for reducing ores.....*Rocker and Basin Gulches*, placer mining is turning out well in these claims.....*The Radersberg Assay Office and Smelting Works*, will be ready for business in August. RAMSEY & Co., of Norwegian Gulch, have made a splendid clean-up. The pay average $10 a day to the man.....*Placer mining is being prosecuted in Basin and Rocker Gulches*, despite the fact that the miners are working with snow four feet deep around them. All are confident that this season's supply of water will be greater than that of any preceding one *Parkinson Lode.* A good deal of excitement was caused in Unionville and Park City by the strike of four feet of solid ore on this lode. A large body of valuable ore is now in full view.

NEW MEXICO.—The *Cimarron News* of the 9th inst., replies to correspondents seeking information with reference to the resources of the Territory, as follows: "The

mines of the Territory have long been known and worked, but in a crude way. On an average the returns have been large, but with capital and improved machinery, much of which is now coming in, New Mexico expects to rank second to none in this respect. The principal mines now worked are the Moreno mines, in Colfax County, gold; the Silver City mines, Grant County, gold, silver and copper; the Socorro mines in Socorro County, same. The precious metals are round diffused all over the Territory in greater or less quantities.....*Coal.*—Plenty chiefly in Colfax County, where there is an aggregate of 900 square miles of bituminous lignite; seven veins in all. Aggregate thickness, 28 feet; largest single vein, seven feet. It is said by experts to be equal to any coal west of Pennsylvania. Also, in Santa Fe County anthracite coal, and lignite in other parts of the Territory.....*Iron ore.*—Plenty in Colfax County and probably else where in the Territory.

UTAH.—*Utah Miner*, June 12th.—The Dugway District is situated 65 miles west of the Chicago Smelter on Rush Lake on the dividing line between Juab and Tooele counties, and borders on the the Great American Desert. One severe trouble is that a want of good water exists near the more precious mines. The principal yield of the district is lead and copper, the latter metal being in considerable quantity.

The Leviathan Copper Mine has a ledge 60 feet in width, carrying an ore vein 12 or 14 inches wide of high grade copper ore of 25 and 30 per cent. pure copper. Some specimens have gone as high as 50 per cent.

The Mayflower is also a good mine, considering that the developments on it are moderate. A recent shipment of ore went 21 ozs. in silver and 63 per cent. lead. The second class has 17 ozs. silver and 50 per cent. lead.

The Virginia is down 65 feet on high grade carbonate and galena ores, some of which go as high as several hundred dollars to the ton.

The Bingham Cañyon Mines are continually increasing their output, and the quality of the ore is said to improve as depth is attained.

The Sam Houston Mine has driven a tunnel into the hill a distance of 210 feet, crossing the vein at a point 50 feet from the place of beginning. The owners are now sinking a shaft on the vein which promises extremely well.

The Abel Proctor, on the southeast side of Bear Gulch, is worked by a tunnel which is in 260 feet. The owners say that they have six feet vein matter between well defined walls.

The Nez Perces is just above the last mentioned property. The Company is shipping between 75 and 100 tons daily, employing about 60 hands. This mine is now consolidated with the Montreal and Grecian Bend. The ore is of low grade, averaging from 30 to 40 dollars per ton, net proceeds, but the quantity in which it it is produced is sufficient to make the mine profitable.

The Albino Lode is situated at the extreme head of Bingham Cañon. The main tunnel is 260 feet in length, and an upper tunnel of 170 feet is run in, showing a strong vein of ore the whole length. A middle tunnel, intended for a working level, is in 150 feet, and in 40 feet more will strike the discovery shaft at a depth of 175 feet from the surface. The ore is of the milling variety. Still the mine will yield well, the average value of the last three shipments of ore being 70 ozs. in silver.

The Red Cloud has a tunnel 325 feet long and a perpendicular shaft sunk 55 feet on the vein. At a few more feet, the two workings will meet on the ore vein.

The Owyhee has a considerable amount of milling ore on the dumps which assays as high as $150 to the ton. It is expected that the shipments from this mine will soon amount to from 10 to 15 tons per day.

The Melissa, located south of the Fannie Bemis, has a tunnel 260 feet striking a 12 foot vein, and has every indication of a good mine. It has already shipped some fair grade ore. The mine, however, is in litigation with the Fannie Bemis.

The Aladdin is working eight men and shipping continually. Much more of the precious material is in sight, going about $60 to $70 to the ton.

The Thrush Mine is located on the east side of Bingham Gulch. Some 20 tons of milling ore are on the dump, taken from a tunnel that is now being run to tap the main vein. A recent assay of the ore showed $68.99 gold, while a general average valuation of the entire ore body is about $35 in gold and $65 in silver. The last shipment of 15 tons brought $110 in gold and silver.

The Hoodly Mine has a shaft 117 feet in length with good ore all the way down. Sixteen tons of smelting ore, carrying from 40 to 150 ozs. of silver and 25 per cent. lead are on the dump.

The Erie Mine has a shaft 50 feet deep, and a tunnel on the vein 35 feet. Twenty inches of solid ore is at the point now reached, and is of a grade carrying 30 oz. silver and 50 per cent. lead.

The Blue Wing has not been worked much, but the showing is good, there being ore carrying 60 per cent. lead and 50 oz. silver.

The Decompose Mine is located a quarter of a mile up Markham Gulch. A car track is being laid, and the dump enlarged, preparatory to extracting the large quantities of ore already available. In a cross-cut, a vein of 47 feet in width was struck, a goodly proportion of which is paying ore; indeed, the face of the cross-cut is still in ore, so that at present the entire width of the vein cannot be judged. Besides the smelting ore that has already yielded some profit, the mine can furnish a large quantity of milling ore. The yellow carbonate ore will approximate in value 70 oz. in silver. Another and smaller vein has been found that carries 40 per cent. lead.

The Yosemite employs forty hands in developing the mine. The houses are all painted and whitewashed, giving them a respectable appearance, unusual in a mining camp.

The Revere is working thirty-five men, and shipping from ten to fifteen tons of good ore daily.

The Excellenza is supposed to be on the Yosemite belt. It is located on the Rough and Ready Hill. A tunnel 200 feet in length has nearly reached the vein which it is expected soon to strike.

The Cumberland has one shaft of 60 feet, and another of 30 feet on six feet of vein matter.

Bear Gulch.—Three companies are here working on auriferous deposits. A supply of water for three months is secured. The claim will pay, during the continuance of water, probably, about $6 or $8 to the hand. Below them, in the same gulch, a company of Chinamen are working, the pay dirt varying from one to three feet. The Hydraulic claim below and back of Bingham City, and owned by BUCK & WILLIAMS, is paying about $6 to the hand.

NOTES.

PROPOSALS FOR CONTRACTS.—We condense the following notes of contracts to be given from the *Engineering News* of Chicago:

Bridge Work.—Bids will be received at the office of the Commissioners of Hamilton County, Ohio, in Cincinnati, until Saturday, July 1st., for masonry, excavation and superstructure for a bridge across Symmes Creek. Specifications at office of Jos. B. HUMPHREYS, Auditor.

Proposals will also be received at the same office for making the approaches to three bridges in Sycamore Township.

Bids will also be received at the same office, for masonry of the abutments of a bridge across Millcreek. Also, for an iron superstructure at the same place, clear span 80 feet; clear roadway 18 feet. Bidders will furnish their own plans and specifications. A full and complete strain sheet to accompany each plan. Said bridge must be of sufficient strength to sustain 100 pounds per square foot of floor surface besides its own weight; factor of safety, 415,000 tension, 12,500 compression. Payments will be made in Hamilton County bonds, bearing interest at 7 per cent. JOSEPH B. HUMPHREYS, Auditor.

Bridge—Proposals will be received at the Auditor's office, Batavia, Ohio, until June 28th, for the superstructure of the following bridges: Two spans 120 feet each across East Fork Little Miami, near East Liberty; One span 165 feet across same stream near Batavia; One span 130 feet across Stone Lick, near the Catholic Church. Bidders will furnish their own plans and specifications. C. J. HARRISON, Auditor.

Bridge—Proposals will be received by the Commissioners of Portage County, Ohio, at their office in Ravenna, Ohio, up to July 1st, for the construction of a triple arch stone bridge over the Cuyahoga river on Main Street, in the village of Kent, in Portage County. Proposals will be for the entire masonry complete, in accordance with plans and specifications; proposals by the perch will not be considered. Plans and specifications are on file in the County Auditor's office. Two piers and one abutment in this job is to be built to Spring Line, under the present bridge now standing, on or before November 1st, 1876, and the entire work to be completed on or before September 1st, 1877. WM. GRINNELL, County Auditor.

Laying Gas Pipe.—Proposals will be received at the Wheeling, W. Va., city gas office, until July 3 for laying an 8-inch gas pipe with drip boxes and pump, across the Ohio River, opposite Twenty-first Street, in said city. All bidders to furnish their own specifications and name the price at which they will do the work to the satisfaction of the Superintendent of Gas Works and Trustees.

Steam Heating Apparatus.—Proposals will be received until July 10, at 12 M., for a steam heating apparatus for the Buffalo State Insane Asylum. Proposals may be in accordance with two plans and specifications, or either of them, marked Nos. 1 and 2 respectively, now in the possession of the Board of Managers; or any party may submit other plans and specifications with their proposals. Proposals will be received for the entire work complete, or for the boilers, engines, fans, piping, radiators, or for any portion of the work herein enumerated separately. Plans and specifications at No. 31 City and County Hall. Proposals will be addressed to WM. F. ROGERS, Secretary, No. 31 City and County Hall, Buffalo, N. Y.

AN IMPROVED IRON FURNACE.—The Zanesville (Ohio) *Courier*, gives the following description of an improvement in iron furnaces, for which a patent has just been granted to Mr. A. F. CASSELL, of that place: The patent covers two kinds of furnaces—puddling and heating, its claims are, economy, both of fuel and time, and the superiority of the iron produced. The old puddling furnaces are so constructed, that a vast amount of fuel—thirty-three per cent.—escapes through the stacks in what is commonly termed "smoke." Mr. CASSELL'S furnace arrests the smoke—or more properly gas—and provides for its complete consumption. A system of hollow tubes admits the air from the outside through the roof over the "bridge" wall, and also into an air chamber in front of the bridge wall, which, with the peculiar construction of the roof and "bridge" produces perfect combustion, and consequently a large saving in fuel. By actual tests, extending through a period of several months, in furnaces at the works of the Ohio Iron Company in this city, it has been demonstrated that the Cassell furnace saves, at the least calculation, twenty-five per cent. in fuel, and from one, to one and a half hours in time to each turn, thus reducing the amount of labor very materially. The value of this invention is seen in the quality of the iron produced. The device for producing perfect combustion destroys the sulphur and other impurities, and of course prevents their amalgamation with the metal—an item of immense value to the iron trade. A word as to the cost. From careful estimates the actual expense in the construction of this furnace, is not to exceed $5 over the old furnace, while the saving in the cost of fire bricks for the "necks" and "stacks" will more than compensate for the expense attending their construction.

STATISTICS OF COAL PRODUCTION.

This is the only Report published that gives full and accurate returns of the production of our Anthracite mines.

Comparative Statement for the week ending June 17.

Tons of 2,240 lb.	1876.		1875.	
	Week.	Year.*	Week.	Year.*
Wyoming Region.				
D. and H. Canal Co	51,333	863,105	74,916	1,464,491
D. L. and W. RR. Co	34,455	568,949	78,010	1,365,452
Penn. Coal Co	24,030	403,799	32,995	572,408
L. V. RR. Co	18,545	402,372	9,373	370,456
P. and N. Y. RR. Co	1,265	12,112	4,304	50,406
C. RR. of N. J	49,030	549,007	17,864	216,945
Penn. Canal	10,268	112,834	865	3,570
	189,526	2,917,178	218,327	4,043,728
Lehigh Region.				
L. V. RR. Co	80,436	961,846	10,906	187,597
C. RR. of N. J	39,979	500,889	425	7,401
D. H. and W. B. RR.	2,069	16,639	2,056	27,326
	122,484	1,479,374	13,387	222,324
Schuylkill Region.				
P. and R. R. RR. Co	133,867	1,742,789	52,229	595,675
Shamokin & Lykens Val.	16,811	342,694	33,629	483,473
	150,678	2,085,483	85,858	1,079,148
Sullivan Region.				
Sul. and Erie RR. Co	134	26,193	—	5,557
Total	462,822	6,508,228	317,572	5,350,757
Increase	145,250	1,157,471	—	—
Decrease	—	—	—	—

* Year beginning January 1st.

The above table does not include the amount of coal consumed and sold at the mines, which is about seven per cent. of the whole production.

The receipts at Port Richmond for the week were 37,500 tons, shipments 25,000 tons, and balance on hand 184,000 tons.

The decrease of shipments of Cumberland Coal over the Cumberland Branch, and Cumberland and Piedmont Railroads amounts to 270,154 tons, as compared with the corresponding period in 1875.

The Exports of Coal from Baltimore for the week were 606 tons, and since Jan. 1st, 9,072 tons, as against 22,660 tons for the corresponding period of 1875.

Perth Amboy business:

	Tons.
Received for the week	23,613
Shipped for the week	15,018
On hand June 17	88,850

Freights to New York, 35c.; Boston, 95c.; Hartford, 90c.

Receipts of Coal at Boston, for week ending June 16, and years from September 1st, 1874 and 1875.

From	Week. Tons.	Previously. 1876. Tons.	1875. Tons.
Alexandria and Georgetown	1,980	66,160	72,635
Philadelphia	19,998	495,237	320,402
Baltimore	5,534	103,001	127,944
Other places	10,891	227,843	186,291
Great Britain	—	4,510	2,224
Nova Scotia	655	14,890	16,770

Shipments of Coal from Richmond, from January 1, 1876, to June 17, 1876, inclusive:

	Two Weeks.	Year.
By Canneliton Coal Company	2,041	14,336
" Peytona " "	857	7,658
" Blacksburg " "	330	4,185
" Coal Valley " "	135	5,318
" Other " "	350	4,525
Total tons	3,713	36,022

Belvidere Delaware RR. report.

	Week.	Year 1876.	Year 1875.
Receipts of coal at Coal Port (Trenton)	6,858	87,526	206
" " " South Amboy	5,573	193,576	20,112
Shipments at Coal Port (Trenton)	4,778	84,127	196
" South Amboy	7,867	182,380	98,308

The Production of Bituminous Coal for the week ending June 17, was as follows:

Tons of 2,000 lb., except where otherwise designated.

	Week, Tons.	Year, Tons.
Cumberland Region, Md.		
Tons of 2,240 lb	41,760	698,990
Barclay Region, Pa.		
Barclay RR., tons of 2240 lb	5,148	149,542
Broad Top Region, Pa.		
Huntingdon and Broad Top RR	2,293	73,343
*East Broad Top	1,336	32,190
Clearfield Region, Pa.		
*Snow Shoe	1,627	26,567
*Tyrone and Clearfield	24,308	497,495
Allegheny Region, Pa.		
*Pennsylvania RR	4,118	90,636
Pittsburgh Region, Pa.		
*West Penn. RR	3,360	92,212
*Southwest Penn. RR	1,465	25,966
*Penn. & Westmoreland gas coal, Pa. RR.	20,599	332,567
*Pennsylvania RR	7,001	135,554

* For the week ending June 7.

The Production of Coke for the week ending June 7.

Tons of 2000 lb.	Week. Tons.	Year. Tons.
Tyrone and Clearfield	..	..
Alleghany Region	..	..
West Penn. RR	1,087	20,805
Southwest Penn. RR	10,486	213,774
Penn. & Westmoreland Region, Penn. RR.	1,117	19,104
Pittsburgh, Penn. RR	3,584	87,198
Total	16,274	340,941

COAL TRADE REVIEW.

NEW YORK, FRIDAY EVENING, June 23, 1876.

Anthracite.

THE demand for anthracite coal shows no improvement, nor are there any indications when a revival will take place. Prices continue to be considerably under circular rates, and outside of the large companies few claim to be holding firm, and some say that with even the concessions they are able to make, they are sometimes by some means beaten by the large companies. So long as there is so great an abundance of coal in market (and there are no indications that stocks, upon the whole, are being decreased), and all are so anxious to do business, so long will under-cutting in prices continue.

There are rumors of two failures in the trade, but at this writing we do not feel justified in giving such particulars as we possess. One of the firms supposed to have failed has been doing a very large business and is well known, and should the rumors be confirmed, would likely show large liabilities.

The New York *Herald* published on the 21st inst. a letter from its correspondent at Wilkes-Barre who, periodically, has some startling development to make. This correspondent now predicts great financial embarrassment to the Lehigh and Wilkes-Barre Coal Company and to the New Jersey Central Railroad Company, and says that "it is anticipated that the Plymouth collieries," of the Lehigh and Wilkes-Barre Coal Company, "four in number," "may be transferred to the Susquehanna Coal Company." Of the financial condition of the Lehigh and Wilkes-Barre Coal Company we know but little, and there are few outside of its own officers who know more, yet we cannot believe that this transfer is at all probable. To secure its loan a mortgage was issued upon all of the property of the company, thereby making it impossible to grant a title to the property mentioned, with any security to the purchaser.

Bituminous.

There is but very little to be said of the trade in bituminous coals. Orders for both Cumberland and Clearfield are very scarce, and prices exceedingly low. The secret reduction of freights that are generally, although not openly being made by the Baltimore & Ohio Railroad, is having some effect in attracting to that route of transportation coal which would otherwise go by the Chesapeake & Ohio Canal. The reduction, however, comes at a time when most of the important contracts for coal are made, and shippers are unable to take advantage of it to increase their business. The shipments of Cumberland coal last week show a falling off of over 17,000 tons, as compared with the corresponding week of 1875, and a decrease since January 1st, of about 258,000 tons, as compared with the same period in 1875.

The shipments from the Clearfield region, although not up to the capacity of the mines, are in excess of those of the corresponding time last year, although a year ago orders had accumulated to a considerable extent with the producers of this region—production having been suspended for a considerable time by a strike. The shipments from January 1st show an increase of over 160,000 tons, as compared with the same period of 1875.

The Cumberland *Alleganian* says: "The defendant has filed its answer in the case of the American Coal Company vs. the Consolidation Company. The document is lengthy and lacks interest enough to warrant publication. It denies the jurisdiction of a court of equity in the case."

Wholesale Prices of Anthracite Coal for June, f.o.b. at the Tide Water Shipping Ports per ton of 2240 lb.

	Lump.	Steamer.	Grate.	Egg.	Stove.	Chestnut.
Wyoming Coals.						
‡Lackawanna and Scranton at Hoboken and Weehawken	4 70	4 80	4 90	5 00	5 60	4 90
Pittston at Newburg	4 55	4 65	4 75	4 85	5 45	4 75
Wilkesbarre at Port Johnston	4 70	4 80	4 90	5 00	5 60	4 80
Plymouth, R. A.	....	....	4 90	5 10	5 70	4 90
Susque. Coal Co. at Amboy W.A.	4 70	4 80	4 90	5 10	5 60	4 90
Kingston at Hoboken	4 70	4 80	4 90	5 10	5 60	4 90
Lehigh Coals.						
Old Company at Port Johnston	5 20	....	5 00	5 00	5 60	4 90
Old Company's Room Run "	5 20	....	5 00	5 00	5 60	4 90
Sugar Loaf, Hobok. & Amb. "	5 20	...	5 00	5 00	5 60	4 90
Lehigh Coal Exchange "	5 20	....	5 00	5 00	5 60	4 90
Honey Brook Lehigh	5 20	....	5 00	5 00	5 60	4 90
Beaver Meadow at South Amboy	5 20	....	5 00	5 00	5 60	4 90
Schuylkill Coals at North 9th st., Brooklyn, E. D.†						
Schuylkill white ash	4 70	4 80	4 90	5 00	5 60	4 80
Schuylkill red ash	....	....	....	5 10	5 70	4 80
Shamokin white and red ash	....	....	....	5 20	5 70	4 80
Lorberry	....	....	5 80	5 80	5 80	4 85
Lykens Valley	....	....	6 25	6 25	6 25	5 30

* Contractor's prices are 20c. per ton less.

†The prices of Schuylkill coals for shipment from Philadelphia are 35c. per ton less than at Brooklyn.

‡ Boats towed by the D. & H. C. Co. at its expense to and from New York harbor.

Per ton.

Freight from Hoboken and Weehawken to New York.... 40c.
" " Elizabethport & Port Johnston to N. York. 40c.
" " South Amboy to New York..... 30@35c.

Freight by the boats of the companies from Hoboken, Port Johnston, Weehawken, Rondout, South Amboy and Perth Amboy to New York City and vicinity 50c.

Freight by the Pennsylvania Coal Company's boats from Newburg to New York 65c.

Wholesale Prices of Bituminous Coal.

Domestic Gas Coals.

Per ton of 2240 lb.	At the Shipping Ports.	Alongside in New York.
Westmoreland and Penn. at Greenwich, Philadelphia	$4 70	$6 00
" " at S. Amboy	5 50	6 00
Red Bank Cannel Pa. at Philadelphia	8 00	8 50
" " South Amboy	8 50	....
" Orrel	6 00	6 50
Youghiogheny, Waverly Co., at Balt.	4 25	5 75
Despard, West Va.	4 50	6 00
Murphy Run, West Va., at Baltimore	4 50	6 00
Fairmount, West Va., " "	4 35	6 00
Newburgh Orrel, Md. " "	4 50	6 00
Cannelton Cannel, W. Va.	....	10 00
" Splint, " at Richmond.	4 50	6 00
" Gas Coal at Richmond.	4 00	5 50
Peytona Cannel, W. Va. at Richmond	8 50	10 00

Manufacturing and Steam Coals.

Cumberland, at Georgetown and Alexandria, Va. ..... 3 50@3 75 — 5 00
Cumberland, at Baltimore ..... 3 80@4 00 — 5 25
Clearfield f.o.b. Canton, Baltimore ... 3 90@.... — 5 25
Rockhill Semi-Bituminous and Broad Top, at the mine, per 2,000 lb., 90, f. o. b. Greenwich, Philadelphia, per 2240 lb., $3 60@3 95, according to destination; at Amboy, 4 60; New York, 5 00.
Clearfield and Allegheny, "Kittanning," "Sterling," "Sonman," and "Eureka," at the mines, per 2000 lb., 90; at Greenwich, Phil., per 2240 lb., 3 75@4 25, according to destination; f.o.b. South Amboy, N. J., 4 75; New York, 5 25.

Foreign Gas Coals.

	Sterling.	Am. cur'cy.
Newcastle, at Newcastle-on-Tyne	9/6@11/	6 50@7 00
Liverpool House Orrel, at Liverpool	26/	13 00
Ince Hall Cannel "	42/	18 00
" Gas Cannel "	28/	13@14
Scotch Gas Cannel, at Glasgow, nominal,	25/	7 50
	Gold.	
Block House, at Cow Bay, N. S.	2 00	4 75
Caledonia, at Port Caledonia	1 50	4 25
Glace Bay, at Glace Bay	1 50	4 25
Lingan, at Lingan Bay	1 75	....
Sydney, International and Reserve mines, at Sydney	2 00	5 50
Pictou, Albion & Vale mines, at Pictou.	2 25	5 75

Retail Prices in New York.

Anthracite.

Per 2000 lb.	Grate and Egg.	Stove.	Chestnut.
Pittston coal, in yard	$5 70	$6 00	$5 30
Lackawanna coal, in yard	5 70	6 00	5 30
Wilkes-Barre, delivered	6 25	6 75	6 00
Lehigh & Locust Mountain, del'd.	7 00	7 00	6 00
Schuylkill Red Ash, del'd	7 50	7 50	6 00

The Cost of delivery for Pittston and Lackawanna coal ranges from 40 cts. to $1 10 per ton, according to distance from the yard.

Bituminous.

Liverpool House Orrel, delivered, per ton of 2000 lb	$18 00
Liverpool House Cannel " " "	.... 22 00
American " " " "	.... 13 00
Cannelton splint, " " "	.... 8 00
Cannelton Block, " " "	.... 8 00
American Orrel " " "	....11@14
Red Bank Cannel " " "	..... 14 00
Cumberland " " "	..... 7 00

Boston. June 17, 1876.

COAL continues dull. The market is apparently abandoned by all classes of buyers, while sellers, notwithstanding the reduction of production, are as anxious to find customers as ever. The supply continues very liberal, most of which is going into the company pockets here. The balance is upon the market more or less demoralized, Anthracite ranging from $4.70@$6 a cargo, and Bituminous $4.75@$5.30. In gas coals there is not the slightest interest.

Freights are easier particularly from Philadelphia, where the tonage is overabundant, quoting New York 90c; Philadelphia $1.15@$1.25; Baltimore $1.44@$1.50; and Georgetown $1.50@$1.60.—*Commercial Bulletin.*

Chicago, Ill. June 20, 1876.

Specially reported by Messrs. RENO & LITTLE, Coal Merchants.

Retail prices per ton of 2000 lb. delivered to buyer.

The prices of coal remain unchanged. Very little doing. The arrivals of coal by Lake lighter than same time last year.

ANTHRACITE.		BITUMINOUS.	
Lehigh Lump	$9 00	Briar Hill and Erie	5 00@ 5 50
Lehigh grate and egg	9 50@10	Walnut Hill, Wa. V.	@ 5 50
Lehigh stove and chest.	10 00	Baltimore and Ohio	@ 5 00
Lackawanna, Wilkes Barre and Scranton		Cannel	@ 8 00
		Blossburg	7 00
Grate and egg	7 50	Indiana Block	5 00
Chestnut	7 75	Hocking Valley "Brooks"	5 50
Stove or Range	8 00	Wilmington and Illinois.	4 00

Cleveland, O. June 21, 1876.

Specially reported by Messrs. BATES & MARTIN.

Herewith find quotations of our market:

Per ton of 2000 lb. f. o. b. vessels.

WHOLESALE.

	For vessels,	On cars.
Youghiogheny Gas Coal	$4 10	$4 00
Cannel	4 25	4 15
Blossburgh	$5 00	$5 00
Briar Hill, Block Coal	3 50	3 25
Straitsville Coal Co., lower vein	3 00	2 90
" " " whole "	2 90	2 80
Hocking Valley	2 90	2 90
Massillon	3 00	3 00
Tuscarawas Valley	2 65	2 60
Columbiana	2 65	2 60

Office of CLEVELAND COAL EXCHANGE,
89 Seneca Street, June 3d, 1876.
PRICES TILL FURTHER NOTICE.

	1 to 10 tons.	10 tons upw'd.
Massillon, Brier Hill and Mineral Ridge, lump.	$4 50	$4 25
" " " " " nut	4 00	3 75
Straitsville Lower Vein, Hocking & Shawnee, l'p.	4 00	3 75
" " " " nut	3 50	3 25
Del Carbo and Rich Hill, lump	3 75	3 50
" " " nut	3 25	3 00
Maple Hill, lump	3 50	3 25
" " nut	3 25	3 00
Columbiana, lump	3 25	3 00
" nut	2 75	2 50
Lackawanna and Wilkesbarre, egg and grate	7 50	7 30
" " stove	8 00	7 75
" " chestnut	7 75	7 50

No Anthracite coal to be sold for future delivery except it be subject to Exchange price at time of delivery.

H. E. CHUBB, Secretary.

Erie, Pa. June 20, 1876.

Wholesale, per ton of 2000 lb. Bituminous f. o. b.

Briar Hill lump	$3 75	Beaver lump	$3 50
Midway	3 25	Cat Fish	3 00

Louisville, Ky. June 20, 1876.

Specially reported by Messrs. BYRNE & SPEED.

Our market is now, as during most of the Winter, very quiet.

Please report our prices as follows:

WHOLESALE.

	per bushel		per bushel
Pittsburgh	12c.	Pine Hill	—
Raymond City	9c.	Kentucky	8c.

RETAIL.

	per bushel		per bushel
Pittsburgh	12c.	Peytona Cannel	20@22c.
Raymond City	11c.	Buckeye "	20c.
Pine Hill	13c.	City-made Coke	10c.
Kentucky	10c.	Anth., per ton, $10 00 to 10 50	
Screened Ittaburgh per load		$3 00	
Screened Raymond City		2 75	
Pine Hill (Kentucky)		2 75	
Cannel		$5 to 5 50	

Milwaukee, Wis. June 21, 1876.

Specially reported by Messrs. R. P. ELMORE & Co.

Retail price per ton of 2000 lb.

Lehigh Lump	$10 00	Briar Hill, select	$8 00
Lehigh Prepared	11 00	Blossburgh	8 00
Lackawanna (all sizes)	10 00	Cannel	8 00
Pittston	10 00	Pittsburgh	7 00
Scranton	10 00	Steam coal	7 00

New Orleans, La. June 15, 1876.

Reported by C. A. MILTEBERGER & Co.

Pittsburgh coal, retail, per bbl	50c.
" wholesale	30c.
" steamboats, per box	40c.
" to manufacturers, per bbl	45c.
" shipments, per hhd	$5 50
Anthracite, wholesale, per ton	....
" retail, "	12 00
Virginia Cannel, per bbl	80c.
Scotch " "	80c.
Mt. Carbon, wholesale, per bbl	...
" retail, "	50c.
St. Bernard wholesale, per bbl	30c.
" retail, "	50c.

Richmond, Va. June 20, 1876.

Specially reported by S. H. HAWES, Dealer in Coal.

Per ton of 2240 lb., f.o.b.

Kanawha Cannel	$9 00	New River Bituminous,	$4 25
" semi-Cannel	4 75	Clover Hill Coal	4 00
Coalburgh Splint	4 20	James River Bitum	3 30
Lewiston "	4 20	" " Carbonite,	5 80
Kanawha Gas coal	4 15		

San Francisco, Cal.

From the *Commercial Herald*, June 15, 1876.

Imports from Jan. 1st to June 1st:

	tons.		tons.
Anthracite	7,492	Vancouver Island	43,235
Australian	26,608	Rocky Mountain	98
Coos Bay	18,213	Seattle	15,388
Cumberland	3,599	Bellingham Bay	10,820
English	10,831	Chili	1,050
Mt. Diablo	43,849		

There is quite a large fleet of coal laden vessels now *en route* and supposed to be near at hand from New South Wales and other foreign marts. This knowledge has a very depressing effect upon the general market and leads to the impression that very low prices are to prevail here during the Autumn and Winter months. The arrivals during the period under review embrace the following cargoes: *Osmyn*, from Seattle, 825 tons; *Henry Buck*, from Nanaimo, 1,009 tons; bark *Elwood Cooper*, from Sydney, with 600 tons coal and 191 tons shale. We are advised as before published that cargo sales of Scotch Steam for autumn delivery have been made as low as $7.50@7.75 per ton. Australian, etc., proportionately cheap. The policy of the shippers is to get their ships to this coast for the Wheat carrying trade, and they are glad to get Coals for ballast, hoping to get high Wheat freights home to pay for the round voyage. The result of these forced contract sales of Steam coal is to reduce prices of all other descriptions below a paying price, and must result in closing more or less of the coast producing mines. The spot price of Wallsend, $10; Sydney, $9@9.50; Anthracite, $12@14; Mt. Diablo, $6.25@8.25; Coos Bay, $9@9.50; Vancouver, $8@10; Cumberland, $15@18. The cargo of English Steam, 1,858 tons, ex *Castle Roy*, from the Westminster Brymebo Mine, which arrived here May 22d, and for which no satisfactory offer has been made, was yesterday offered at public auction, the same being fresh wrought and screened. This was done to test the true condition of the market, the result being a sale to the Pacific Mail Steamship Company at $9—30 and 60 days. The Br. ship *Min-y-don*, 46 days from Sydney (quick dispatch), is at hand with 1,473 tons.

Pittsburg. June 21, 1876.

COAL.—There is no movement in coal hereabouts, nor is it to be expected as long as navigation continues suspended; however, as noted in our last report, nearly all the large operators who run their coal by river, would like to have navigation continue as it is until October or November, so as to get stocks reduced in the Southern and Western markets. Prices are down so low that there is little or no margin for profit, and there is no chance for an advance as long as the supply is so much in excess of the demand. Trade with those points accessible by rail only is also dull, and there is not much prospect of any improvement during the next thirty, perhaps sixty days.

COKE.—As previously intimated in these columns, efforts are being made to form an association similar to that of the iron and glass manufacturers, but whether or not the movement will be a success we are not at this moment prepared to state. That an organization of this character is necessary there is no doubt, but whether all the conflicting interests can be satisfactorily harmonized is another matter; however, while knowing little in regard to the drawbacks in the way, we can see no reason why a movement of this character should not be successful. One of the main objects in view would be to keep prices up to a point that would afford a living margin for profit, also to regulate production. Trade continues sluggish and no improvement need be looked for until there is a decided change for the better in the pig iron market. Prices nominally unchanged; $2.40@2.50 per ton delivered free on cars in Pittsburg. — *American Manufacturer.*

Montreal. June 15, 1876.

Specially reported by Messrs. ROBERT C. ADAMS & Co.

Wholesale per ton of 2240 lb.

Scotch Steam	$4 60	Cape Breton Steam	$4 00
Pictou "	4 50	Newcastle Smiths.	5 50

Anthracite at retail, per 2000 lb., delivered.

Egg	$6 70	Chestnut	6 40
Stove	7 15		

Toronto, Ont. June 15, 1876.

Chestnut	$7 25
Stove	7 50
Egg and grate	7 25
Bituminous coal for domestic use	6 00
" " steam	3 50@5 50
Lehigh Lump and broken	7 50
Blossburgh	6 50

Freights.

Per ton of 2240 lb.

PORTS.	From Philadelphia.	From Baltimore.	From Georgetown.	From Elizabethport, Port Johnson, South Amboy, Hoboken and Weehawken.
Augusta, Me.	....	2 00	....	....
Albany	†80	...	...	....
Amesbury, Mass.	....	....	....	....
Bangor, Me.	....	1 45	....	90
Bath, Me.	1 45	1 45	150–55	90
Baltimore	....	....	....	....
Boston, Mass.	1 15@1 30	1 45	1 60	1 00
Bridgeport, Ct.	†1 00	1 40	....	60
Bristol, R. I.	....	....	....	80
Cambridgeport, Mass.	§1 25@1 35	....	...	90
Derby	....	....	....	....
Dighton	....	....	....	....
East Cambridge	§1 25@1 35	....	....	§90
Fall River	1 20@1 25	1 40	1 45	80
Hackensack	*70	....	....	....
Hallowell, Me.	....	....	....	....
Hartford	*70	2 00	2 00	....
Hoboken	†70	1 25	1 35	40
Hudson	....	....	1 50	....
Jersey City	70	1 25	1 35	40
Lynn, Mass.	....	....	....	‡1 00
Middletown	....	....	....	1 00
Mystic	....	....	....	....
Newark	....	1 50	1 50	....
New Bedford	1 25	1 40	1 50	80
Newburyport	....	1 60	1 75	1 00
New Haven	*70	1 40	1 45	60
New London	1 10	1 40	1 45	65
Newport	1 25	....	....	80
New York	1 00†	1 30	1 35	40
Norwalk	1 00@1 25	1 50	....	60
Norwich	1 20‡	....	....	70
Pawtucket	1 25‡	....	....	....
Philadelphia	....	....	....	....
Portland	1 25	1 45	....	90
Portsmouth, N. H.	1 30@1 40	1 60	1 65	1 00
Providence	1 20@1 25	1 40	1 45	80
Poughkeepsie, N. Y.	....	....	....	....
Rockport	....	....	....	....
Saco	....	....	175–80	....
Sag Harbor	....	....	....	1 00
Salem, Mass.	1 25@1 35	1 50	1 60	90
Salisbury Pt., Mass.	....	....	....	....
Stamford	*70	....	....	60
Stonington	....	....	....	80
Taunton	....	....	....	....
Troy	†80	....	....	....
Warren, R. I.	....	....	....	80
Wareham	....	....	....	....
Weymouth	....	....	....	....

* And discharging and towing. † And discharging. ‡ And towing. § 3c. per bridge extra.

ROBERT CROOKS & CO.'S METAL CIRCULAR.

LIVERPOOL, 8th June, 1876.

PIG IRON.—There was a steady market for Warrants during May, the fluctuations being only between 57/ 9d. and 58/ 6d. This week, however, business has been quiet, and some transactions have taken place at 57/ 7½d. closing sellers yesterday at 57/ 7½d. Makers' special brands have been in but moderate request, and the following figures show various reductions, excepting Coltness, which is 1/ 6d. per ton higher. No. 1 Gartsherrie, 65/ 6d.; Coltness, 69/ 6d.; Summerlee, 63/; Monkland, 58/ 6d, f.a.s. Glasgow; Glengarnock, 64/ 6d.; Eglinton, 57/ 6d., f.a.s. Androssan. Furnaces now blowing are 116. Stocks in Connal's Stores have slightly increased, being 63,528 tons on 2d June. For all May, shipments show an advance over last year of about 3,000 tons. Shipped week ended 3d June, 11,019 tons.

FINISHED IRON.—During the past month bars have receded in price from 2/ 6d. to 5/ per ton, and Staffordshire are now procurable at £7 7/ 6d. to £7 10/, whilst equal quality of Crown Bars, of Lancashire or other make, can be got from £7 2/ 6d. to £7 5/. Hoops have dropped 12/ 6d. per ton, principally owing to the usual requirements for baling cotton having been placed with American makers this year. Sheets and plates have also given way about 5/ per ton. Demand is very moderate, and few mills have been working full time, so that deliveries have been made punctually.

CANADA PLATES have given way 10/ per ton during the month, and there has been a fair demand. Present quotations are for the most part nominal, and makers would be inclined to meet any reasonable offer, as nothing like the usual number of orders have come on the market as are generally placed by this time. Prices having come down now to about the lowest point, purchases can be made on pretty safe basis.

TIN PLATES.—The past month has been one of extraordinary depression. Even by offering extremely low prices, makers have with the greatest difficulty managed to get work to keep their mills going, even though the majority are stopping one week in three. Of the few makers who will not sell under cost, and who are consequently only obtaining contracts where there is no option of brands, some are working slowly into stock, and some have shut up their works entirely. Should the market not improve, the number adopting this latter course will be largely augmented, and the production left entirely to less independent manufacturers, and these cannot long stand the strain of selling so much below cost. The lowest sales are being made for prompt delivery and prompt payment, and these bottom figures would not be workable for protracted deliveries.

COPPER has shown very little variation, and closes weak at the lowest point touched.

TIN.—An artificial impetus was given to this article about the middle of the month, but the advance could not be maintained in face of import and stock figures, both of which were heavy, and though we are not able to-day to quote the prices of our last monthly circular, yet the market is weak, and it is probable a day or two will bring us to the same range of figures.

LEAD.—Manufactured shows a larger drop than pig, for which there has been more demand, though not sufficient to prevent it also sharing in some degree the depression prevailing in the market.

FREIGHTS.—The rates mentioned for Montreal and Quebec are only for rough weight, such as iron. For tin plates, 2/ 6d., and for galvanized iron, 5/ extra is wanted to these ports—the Steamship Companies basing the rates on the value of the goods. To New York, 12/ 6d.; Boston, 5/; Baltimore, 10/; Philadelphia, 15/; Montreal, 12/ 6d.; Quebec, 12/ 6d.; Toronto, 17/ 6d.; Hamilton, 17/ 6d.

EXPORTS FROM LIVERPOOL TO—

DESCRIPTION.	NEW YORK.		BOSTON.	
	May, 1876.	May, 1875.	May, 1876.	May, 1875.
Sheets, Bars, Plates, &c. tons	88	164	289	1,083
Railway Iron "	..	..	..	60
Pig Iron "	355	120	..	254
Chain "	15	27	2	..
Wire "	42	66	1	77
Copper and Yellow Metal.. "	..	11	33	7
Tin and Terne Plates....boxes	59,136	38,338	11,485	14,322

DESCRIPTION.	PHILADELPHIA.		BALTIMORE.	
	May, 1876.	May, 1875.	May, 1876.	May, 1875.
Sheets, Bars, Plates, &c. tons	84	145	70	50
Railway Iron "	..	..	..	601
Pig Iron "	160	270	667	..
Chain "	..	20	4	2
Wire "	2	2	..	..
Copper and Yellow Metal.. "	..	..	..	..
Tin and Terne Plates....boxes	17,648	15,407	8,126	8,355

ENGLISH RAILS.

Messrs. JOHN H. AUSTIN & Co. quote as follows:

LONDON, June 7, 1876.

American rails, 50 to 60 lb. per yard, f.o.b. Wales, £6 per ton; American rails, 50 to 60 lb. per yard, f.o.b. East Coast, £6; Steel rails, f.o.b. England, £8@£8 10/.

IRON MARKET REVIEW.

New York.

FRIDAY EVENING, June 23, 1876.

American Pig.—It is a rare exception to find those in the trade who have encouraging reports to make, the majority say that business was never worse, and that they do not see any encouragement for the early future. Prices are nominally the same, although there are not inquiries of sufficient importance to test the market. We note sales of 600 tons of forge and No. 2 foundry iron at $21.50, at furnace; 400 tons at $20, at Hoboken; and 200 tons No. 1 foundry at $22, all Thomas Iron Company's iron. In addition to this we note a sale of 300 tons of Port Orem forge at $19. We quote No. 1 foundry at $22; No. 2 at $20; and forge at $19@20.

Scotch Pig.—Trade in this article is as quiet as that in domestic iron. The arrivals during the week have been about 600 tons. 200 tons of this amount were sold previous to arrival, and the balance will likely go into store, being the first lots that have gone into store for a considerable time. We nominally quote as follows: Eglinton, $27.50@$28; Coltness, $30; and Glengarnock, $28@29.

Messrs. JOHN E. SWAN & Brothers, Limited, of Glasgow, under date of June 9, report 116 furnaces in blast, as against 121 a year previous; stock of pig iron in CONNAL & Co.'s stores 63,188 tons (a decrease of 340 tons from a week previous) as against 37,440 tons at the corresponding time last year; shipments for the week ending June 3, 11,019 tons, as against 8,708 tons for the corresponding week of 1875, showing a decrease since December 25, as compared with the corresponding period of 1874–75, of 33,015 tons; quotations of No. 1 iron as follows: Gartsherrie, 64/ 6d.; Coltness, 68/ 6d.; Summerlee, 61/ 6d.; Langloan, 67/; Glengarnock, 63/; and Eglinton, 57/; quotations of freights as follows: to New York, 3/ 6d.; Boston, 9/; New Orleans, 5/; Baltimore, 8/; Philadelphia, 10/; and San Francisco, 27/ 6d.

Rails.—We are reported sales of 500 tons of iron, and 1,000 tons of steel on private terms. There continues to be a fair inquiry. We quote iron rails at mills, at $39@42; and steel at $58@63.

Old Rails.—We are reported a sale of 300 tons at New Haven, at $21.25. We quote $21.50@22.

Scrap is very quiet, and quoted at $28@29.

Philadelphia Iron Trade.

Weekly report of the Philadelphia Iron Market, furnished by Messrs. JUSTICE, COX, JR., & Co., Iron Merchants, 333 Walnut street, Philadelphia. Week ending June 22, 1876

The general position of the iron market has not varied much since the date of our last report. There is a very fair demand for forge or mill iron, which is in light supply and is held more firmly; while there is a light demand for foundry irons, and prices are softening, if it were possible, at the very low prices now ruling. At these prices all furnace-men aim to make foundry iron, as it is the only grade that will let them out whole; hence the light supply of forge. We quote $22 to $23 for No. 1; $20 to $21 for No. 2; $19 to $21 for forge, firm. Report sales 500 tons St. Charles; 200 tons Montgomery; 100 tons Chickeries at quotations.

BARS.—Manufactured iron is unusually depressed and dull of sale at this time. There is some order among the plate men, but at such prices it is a question whether they would not be better without them. No change in prices since our last.

RAILS.—Considerable inquiries, but no sales reported. We quote $40 to $44.

OLD RAILS dull of sale at $22 to $23.

SCRAP dull. We quote $26 to $30.

Baltimore. June 21, 1876.

Specially reported by Messrs. R. C. HOFFMAN & Co.

We have no change to note in the iron market since our last report. Best brands are in light supply, with considerable sales at quotations:

Baltimore Charcoal	$30@35	Anthracite No. 3	$20@21 co
Virginia Charcoal	28@34	Mottled and White	17@19 co
Anthracite No. 1	23@24	Charcoal C B.Blooms	65@67 50
" No. 2	21@22	Refined Blooms	52 50@55

Boston. June 17, 1876.

PIG stands just as it has been reported the past two weeks, only one or two of the prominent holders quote some of their brands of No. 1 50 cents higher but as no business results at the figures it is merely a nominal asking. The inquiry is very trivial; price is no inducement to foundries to take a ton more than they can see an immediate and positive out-look for.

BAR is quiet just now on the strictly mechanical demand, but the inquiry from country storekeepers is picking up. They are seeking to sort up in a very conservative way their stocks, and we do not learn, of any getting a pound under $51, the majority paying $52. The fact that one of the leading houses is out with a blacksmiths' circular, dated June 5, quoting 2¾c, is a symptom of a better feeling among dealers here. The lowest price now to such buyers is 2 3-10c. The activity in Bath, where 28 vessels are on the ways and being laid down, and in other ports thereabouts, has made ship bolt iron in better request, and is possibly the cause of one order of 500 tons being this week placed with a Boston mill by a Boston dealer. From the West the reports continue to suggest a firm tone, 2c is the lowest, and a 25c freight. The strike there is thought hereabouts is quite fortunate if it only succeeds in reducing production. We continue to quote dealers' rates on blacksmiths' orders 2 3-10@2¼c. per pound, and to large machine shops $51@52.50 a ton.—*Commercial Bulletin.*

Chattanooga, Tenn. June 20, 1876.

Specially reported by J. F. JAMES. pig iron broker, etc., 233 Market Street.

There is nothing new to note in the condition of our market since last report. Stocks in cold short mills are accumulating here.

The usual four months is given on quotations below:

Tenn. Ala. and Ga. Charcoal, No. 1 foundry	$21@	22
" " " " No. 2 foundry	20@	21
" " " " gray forge	17@	18
" and Georgia coke, No. 1 foundry	18@	19
" " " " No. 2 foundry	17@	18
" " " " gray forge	15@	16
White and Mottled	14@	—
Tennessee and Georgia cold-blast car wheel	24@	25
Alabama " " "	24@	25
Old Rails	cash	22 00
Cast Scrap	"	12
Wrought Scrap	"	16

Cincinnati. June 20, 1876.

Specially reported by Messrs. TRABER & AUBERY, commission merchants for the sale of pig iron, blooms, ore, etc.

Our pig iron market is quiet, as usual at this time of the year. We quote:

CHARCOAL.			
Hanging Rock, No. 1 Foundry	$25 00@	....	—4 mos
" No 2, "	23 00@	....	—4 mos
" Mill	22 00@	....	—4 mos
Tennessee, No. 1, Foundry	23 00@24	00	—4 mos
Tennessee, No. 2, "	22 00@23	00	—4 mos
" Mill	21 00@22	00	—4 mos
Missouri, No. 1, Foundry	@	....	—4 mos
STONE COAL.			
Ohio, No. 1, Foundry	23 00@	....	—4 mos
" No. 2, "	22 00@	....	—4 mos
Ohio Mill	21 00@	....	—4 mos
Missouri, No. 1 Foundry	26 00@	....	—4 mos
" No. 2, "	24 00@25	00	—4 mos
" Mill	23 00@24	00	—4 mos
CAR-WHEEL.			
Hanging Rock, C. B	40 00@45	00	—4 mos
Tennessee "	30 00@32	00	—4 mos
Missouri "	32 00@35	00	—4 mos
Alabama "	30 00@32	00	—4 mos
BLOOMS.			
Charcoal	60 00@ 75	00	—cash
SCRAP IRON.			
Cast	50c.@	85	—cash
Wrought	1 00@1	30	—cash

Cleveland, Ohio. June 20, 1876.

Messrs. C. E. BINGHAM & Co., quote as follows:

Per gross ton, on four months' time. Subject to change in market. Discount for cash 4 per cent.

FOUNDRY IRON.		
No. 1, Lake Superior Charcoal	27 00@	....
No. 2, " " "	26 50@	....
No. 1, Anthracite	25 50@	....
No 2, "	23 00@	....
No. 1, Bituminous	25 00@	...
No. 2, "	23 00@	....
American Scotch, No. 1, Cherry Valley	27 00@	....
" " B—1, " "	26 00@	....
" " No. 2, " "	24 00@	....
No. 1, Massillon	26 50@	....
B—1, "	25 00@	...
No. 2, "	22 00@	...
CAR WHEEL AND MALLEABLE IRON.		
No. 3 Lake Superior Charcoal	27 00@	....
No. 4 " "	27 50@	....
Nos. 5 and 6 "	27 50@	...
BESEMER IRON.		
Nos. 1 and 2 Lake Superior Charcoal	27 00@	....
FORGE IRON.		
No. 1, Gray	22 00@	....
White and Mottled	20 00@	....

Louisville. June 20, 1876.

Specially reported by Messrs. GEORGE H. HULL & Co.

The market is dull, but without change. The prospect for cold blast iron looks better, from the fact that most of the lots that have been pressed on the market at low figures have been taken up. The stock on hand is light, but fully equal to all prospective requirements.

The usual time, four mos., is allowed on the quotations below:

HOT BLAST—CHARCOAL.		
No. 1 Foundry, from Hanging Rock Ores	$24 00@	26 00
No. 2 " " "	22 00@	23 00
No. 1, Mill, from " "	20 00@	21 00
No. 1, Foundry, from Alabama, Georgia and Tennessee ores	22 00@	23 00
No. 2, Foundry, from Ala., Geor'a and Tenn. ores	21 00@	22 00
No. 1, Mill, from " " " " "	20 00@	21 00
HOT BLAST—STONE COAL AND COKE.		
No. 1, Foundry, from Hanging Rock Ores	22 00@	23 00
No. 2, " " " " "	21 00@	22 00
No. 1, Mill, " " " " "	20 00@	21 00
No. 1, Foundry, from Ala. Ga. and Tenn. Ores	22 00@	23 00
No. 2, " " " " "	20 00@	21 00
No. 1, Mill, " " " " "	19 00@	20 00
No. 1 Foundry, from Missouri Ores	— @	—
No. 2 " " " "	— @	—
No. 1 Mill, from Missouri Ores	24 00@	25 00
COLD BLAST—CHARCOAL.		
Car Wheel from Hanging Rock Ores	35 00@	40 00
" " Tennessee "	28 00@	30 00
" " Alabama and Georgia Ores	28 00@	38 00
" " Kentucky Ores	28 00@	38 00

Pittsburg, Pa. June 21, 1876.

PIG IRON.—While, as stated in our last issue, the puddlers' strike is virtually ended, business continues very dull, and, furthermore, there does not appear to be much prospect of any immediate improvement. As yet less than half a dozen of the mills have started up their puddling furnaces, the majority of the larger mills refusing to comply with the puddlers' terms, and having but comparatively few orders and a fair supply of muck bar, the probability is that they will not start up their puddling furnaces until the fall trade sets in, unless there should be a very decided change for the better in the meantime. The consumption of pig iron at present is small, as there are but three or four mills puddling, hence the demand is exceedingly light, and the market, in consequence, very dull; but for stocks being small, and producers generally able to hold, it would be difficult to sustain prices, notwithstanding current rates scarcely cover actual cost. The stock of pig, not only here, but at those points tributary to this market, is more reduced now than it has been for a number of years, and with anything like an average consumption, without an increase in the production, the supply would soon be exhausted; as it is, however, there is very little, comparatively speaking, being used and the supply, therefore, notwithstanding it is small, is in excess of the demand. Unless the outlook for the products should improve considerably, so as to induce the mills to anticipate future wants, business is likely to continue dull until the latter part of next month; furthermore, it is customary with many of the mills to stop in July to take stock and make repairs. Foundry irons are almost as much neglected as mill, and are likely to continue so during the next 30, perhaps 60, days.

MANUFACTURED IRON.—There was a regular meeting of the Western Iron Association last week, but the only business transacted of any general importance was the appointing of a committee to meet with a committee of Eastern manufacturers to confer in regard to the establishing of an Eastern association similar to the Western Combination. The Western organization is almost completed, as it embraces almost every firm of any consequence in the West, and notwithstanding there are a great many conflicting interests to harmonize, and the movement one of the most formidable of the kind ever attempted in this country, it appears, so far as we can learn, to be working satisfactorily, and bids fair to subserve the purposes for which it was organized. At present business is very dull, as it usually is at this particular time, but there is an absence of that ruinous "cutting" so common prior to the formation of the Combination. No change in prices; $2.30@$2.50, 60 days, according to quantity, Pittsburg list.—*American Manufacturer.*

Richmond, Va. June 20, 1876.

Reported by ASA SNYDER, Esq.

No change in previous quotations in charcoal pig iron. Very little doing.

Virginia Cold Blast Charcoal Pig Iron				$27 to	$33
" Warm " "	" "			24 to	28
" " " Coke	" "	1 X		23 to	24
" " " "	" "	2 X		21 to	22
" " " "	" "	3		20 to	21
" Anthracite	1 X			24 to	23
" "	2 X			22 to	22
" "	3			21 to	25

San Francisco, Cal.

From the *Commercial Herald*, June 15, 1876.

The Selby Smelting Works Company continue to turn out liberal supplies of "Selby" pig lead; prices of which, and its various products, remain as for a long time past. The company furnish sheet lead, pipe lead, bar lead, etc., sufficient to supply the entire wants of the Pacific Slope. Sydney pig tin is very plentiful, and can be bought under 20c. Tin plate is plentiful and cheap. Pig iron, of all the various brands of Scotch and English, as well as American and Oregon, is plentiful; stocks large and prices both low and nominal, say $30@32.50. HOLBROOK, MERRILL & Co. advertise for sale at a bargain their large tinners' stock, etc., saved from the late fire; assortment great, bargains many.

St. Louis. June 20, 1876.

Specially reported by Messrs. SPOONER & COLLINS, Commission Agents for all kinds of Iron.

No change to report in prices. Demand looking up a little.

We quote same as last:

Mo. Stone Coal No. 1 Fy.	$25@26	Massillon iron, A No	1.29@30
" " " 2 "	23@24	" " B "	1.3.@—
" " Gray Mill,	22½@23	" " "	2.28@—
" Charcoal No. 1, Fy.	23@24	Cold Bl. Car Wheel, Mo.	30@33
" " " 2, "	22@23	" " " " Tenn.	30@33
" " Gray Mill,	22@23	" " " " Ala.	30@33
Tenn. " No. 1, Fdy	23@24	" " " " H. R.	33@35
" " " 2, "	22@23	Mo. Charcoal Blooms	50@55
" " Gray Mill	22@23	" Scrap "	45@55
Va. Coke, No. 1, Fdy.	24@25	" " hammered Billets	75@80
" " " 2, "	23@24	Assorted Bar Iron 2 50, 60days	
" "Gray Mill,	21@23	No. 1 Wrought Scrap 90c. cwt.	
H. R. Char. No. 1, Fdy.	25@26	Heavy cast " 70 "	
" " " 2, "	24@25	Light " 50	
" " Gray Mill,	24@25		

Montreal. June 6, 1876.

We continue to quote: Pig iron Eglinton and Clyde $19@20.00; Carnbroe $20 00@21 00; American $22@24; Summerlie and Calder $20@21; Langloan and Gartsherrie $21@22; Coltness $21.50@22.00; Hematite $27@28. Bar, per 100 lb., Scotch and Staffordshire, $2.15@2.25; best do., $2.45@2.55. Swedes and Norway $5@5.50; Low Moor and Bowling, $6.50@7—*Monetary Times.*

METALS.

NEW YORK, FRIDAY EVENING, June 23, 1876.

A very quiet business is reported in all the articles of this list, and no change for the better can be looked for until after July 4.

Gold Coin.—During the week under review gold has ranged from 112@112⅝, and closed at 112.

Bullion.—The market abroad is very weak under the late lower rates at which the Indian Loan was taken, and in the absence of demand from any quarter. Cable information quotes the London market at 50⅜@50¾d., a decline of 1d. since our last. This market, in sympathy, has declined to 110½ per oz., a decline of 2¼c. since our last, while San Francisco quotes 14 per cent. discount, as against 13 per cent. last. Gold bars are nominally unchanged at ¼ to ⅜ premium in this market and 77/9. in London.

Copper.—The sales during the week have been about 200,000 lb. mostly at 19¼c. although it is said some sold as low as 19¼c. The closing price is 19¼c. asked.

Mr. MURRANT says of copper: "In Chili quotations have shown a gradually weakening tendency in spite of small charters, and the price has slipped from £79 to £77 10/, without causing any impetus to business, the latter being the selling price last night. Australian has fallen rather more, Wallaroo say from £84 10/ to £82, at which business resulted to-day, ex next sale. It would be very difficult to account for the depression now existing in this article, the position being in no way altered for the worse from that of a few months since. The feeling, however, seems to gain ground that a lower range of prices must shortly ensue."

Messrs. VON DADELSZEN & NORTH say stocks were as follows:

	May 1, 1876.	June 1, 1876.	June 1, 1875.	June 1, 1874.
	Tons.	Tons.	Tons.	Tons.
Stock, Liverpool & Swansea	9,643	10,806	12,756	18,140
" Havre	4,000	3,955	1,555	2,720
" London	7,358	6,030	7,837	6,269
	21,001	20,791	22,148	27,129
Chili Produce, afloat and chartered	*11,000	†8,700	6,200	7,500
Total	32,001	29,491	28,348	34,629

* Besides this there are 2,500 tons advised by cable.
† " " " " 3,450 " " "

Messrs. JAMES & SHAKSPEARE announce to be sold on the 27th inst., Wallaroo copper as follows: about 1,535 tons in cakes, and about 308 tons in ingots.

Tin.—The London and Singapore markets have shown a further decline, and our market with but a very light business doing has sympathized with the decline abroad, and prices are now, for wholesale lots, as follows: Straits, 17⅛c.@17¾c. gold; L. & F., 17¼c.@17⅝c.; Refined, 17⅛; and Banca, 21⅛c. gold.

Mr. ERNEST W. S. MURRANT, of London, under date of June 9th, says of tin: "In Foreign great interest was evinced in the action of the Dutch Trading Company, who, at their sale of about 950 tons Banca, on the 31st ult., reduced their limit from 50fl. to 45fl. The fact that the stuff only averaged ½fl. over the reserve price, is sufficient to prove that the company showed a wise appreciation of what the market value really was. The impression produced on this market was considerable, and Straits, which had been worked up to 76/ 6d., went to 73/ 6d., but has since recovered to about 74/, at which price, however, there are, at the moment of writing, considerable quantities offering, both on spot and forward. The belief is, that if present prices are to be maintained, fresh speculators must be found, or the present operators for a rise will have to considerably increase their holdings; as we have now on the spot over six months' supply for both England and the Continent. Meanwhile large numbers of tinplate works are being stopped, and in consequence the consumption of the article daily decreases."

Messrs. VON DADELSZEN & NORTH say stocks, at respective dates, were as follows:

	May 1, 1876.	June 1, 1876.	June 1, 1875.	June 1, 1874.
	Tons.	Tons.	Tons.	Tons.
Banca on warrants	620	1,408	985	892
Arrived for next sales	2,092	1,426	2,406	2,854
Afloat for " "	320	384	735	771
Billiton in Holland	1,186	923	722	1,056
Afloat	1,000	960	640	768
Foreign tin in London warehouse	6,379	6,960	5,325	2,222
Do. not landed	1,149	515	541	161
Straits, afloat, advised per mail and telegraph for Europe.	630	500	600	100
Australian afloat	1,770	1.500	1,000	1,500
Total	15,146	14,576	12,954	10,324
Price of Straits	£72	£74	£83	£100

Tin Plates.—There is but a very small business doing. Quotations are unchanged and as follows per box, prices in gold: Charcoal tins, $6.75@7.25, and ternes, $6.37½@6.63¾; coke tins, $6, and ternes, $5.50@5.75.

Lead.—We are reported a sale of 90 tons from dock, at a private price, but supposed to be at a figure considerably under the market. About 75 tons additional are reported to have been sold at about 6¼c. gold, which is the closing price for ordinary domestic. About 200 tons of Newark are reported to have been sold at a low figure. Spanish lead can be laid down here at about 6·70c. gold. The markets both here and abroad have a downward tendency.

Spelter and Zinc.—Domestic spelter is very much demoralized. The Combination claims to hold firm a

8c. currency, usual terms, but by some means there is always considerable being offered by outside parties at a concession. About 30 or 40 tons are reported to have been sold during the week at 7¾c.@7⅞c. currency. Sheet zinc is quoted at 8¾c.@8¾c. gold.

Antimony is in but moderate demand at 15½c. gold.

Quicksilver is in light demand and shows a further decline. Quotations are as follows: New York, 53@54c., gold per pound; San Francisco, 49c.@50c.; and London, £9 per flask.

The San Francisco *Commercial Herald* of June 15 says: "We have little to add to the figures presented last week. The receipts from the various mines continue to be quite liberal, and in the absence of an export demand stocks appear to be accumulating. Holders do not seem disposed to break the market, and go below 50c., no one liking to be the first to knock under, but we expect to see a break ere long. At the close we are advised of some 1,500 flasks in lots for export at 50c. down to 49c., the latter rate paid for 500 flasks."

MINERALS.

LONDON, June 9, 1876.

Messrs. R. P. KELLY & Co., quote as follows: Acid, Citric, 2/7 to 2/9; Muriatic £4 to £8; Sulphuric, £3 10/ to £4; Tartaric, 1/4 to 1/ 5¼; Beatson's Alum, best lump, loose and in barrels, £7 15/ to £8 5/ Ground, £9; Cake Alum, £6 10/; Ammonia, Carbonate, 5d. to 5¼d; Muriate, £32 to £35 Sulphate, white and gray, from £18 to £19; Sal Ammoniac 44/ to 45/ Arsenic, white powdered, £12 5/ to £12 10/; Benzole, 30 per cent. 2/3; 90 per cent. 6/; Bleaching Powder, £7 15/ to £8; Copper Sulphate, £23 10/ to £24; Green and Rusty Copperas, 62/6 to 65/; Epsom Salts refined, £5 15/ to £7. Potash Salts; Bichromate, 4¼d. to 5d; Pots, 28/6 to 32/; Pearls, 38/ to 42/; Chlorate, 9¼d; Muriate, 80 per cent. £6 to £6 5/ f.o.b.; Red Prussiate, 2/2 to 2/3; Yellow Prussiate, 11¼d; Tartrate (Cream of Tartar), French, £6 2/6 Saltpetre, refined, 22/ to 23/6. nominal. Soda Salts; Acetate, £27; Bicarbonate £11; Borate (Borax), refined, £53; Soda Ash, 48 to 50 per cent. 2d ex ship or landed; Soda Crystals, £4 ex ship; Caustic, Cream 60 per cent. to 70 per cent., £13 5/ to £16 5/; white, £14 15/ 70 per cent. white, £19; Nitrate, 11/6 to 12/; Sulphate (Glauber Salt), £6 to £6 10/; Salt Cake, £2 15/ to £3.

FINANCIAL.

New York Stocks.

FRIDAY EVENING, June 23, 1876.

THE past week has been a momentous one for the coal-carrying shares, a decline varying from nearly 10 to 4 per cent. having occurred in the principle quotations, with the transactions footing up nearly 54,000 shares, an increase of 42,500 shares, and this in the face of a generally dull market.

New Jersey Central Railroad.—The course of this stock has been the feature of the week. The extreme regular quotations have been 81¼ down to 72¾ regular, closing at 74, a recovery of 1¼ per cent. from the lowest point. The stock has sold, however, down to 69¼, seller, 60 days; the aggregate sales for the six days amounts to 30,637 shares.

Delaware, Lackawanna and Western Railroad. 18,916 shares represent the transactions in this stock and about 4 per cent. covers the range of the quotations, closing at 106½, an advance of 2 per cent. from the lowest point of the week, a decline, however, of over 1 per cent. from the closing in our last.

Delaware and Hudson Canal Company.—This stock in sympathy with the market, exhibited wide fluctuations, and closed at a decline of nearly 3 per cent., with sales of 1,400 shares for the week.

Mariposa Land and Mining Company.—We note an advance of about $2 per share in this stock, with sales amounting to over 2,100 shares. The following is by telegraph from the Superintendent of the tunnel: "Outlook improved. One foot seam in middle of vein. Is low grade, with sulphurets. Will widen as we follow south, and constantly improve in quality We have undoubtedly struck mouth end of ore shute. Both cross-cuts are in the walls of the lode."

Chesapeake and Ohio Railroad.—$3,000 at from 28½ to 29, represents the transactions in the first mortgage bonds of this company. The foreclosure mortgage suit is steadily proceeding against the company, and will probably reach a sale during the approaching Autumn. In the meantime the Committee on Purchase and Re-organization announce that the holders of $11,000 000 out of a total of $15,000,000 first mortgage bonds, and $10,900,000 out of a total of $12,131,000 seven per cent. bonds, have signified their assent to the proposed plan of re-organization, and those who have not yet made known their purpose in this regard, are urged to do so as soon as possible. Meantime the property is being economically worked, and the earnings are increasing steadily.

Atlantic Coal Company.—This stock is held on the Baltimore stock market at $2.10 per share, with limited dealings.

Joggins (New Brunswick) *Coal Company.*—180 shares of this stock, per value $3 per share, recently sold at 66⅔ par cent.

The Renton (California) *Coal Company*, has levied an assessment of $1 par share, delinquent July 20th.

The Vancouver Coal Company, has declared a dividend of 10 per cent. for the half-year ending 31st December, 1875.

Union Pacific Railroad Company.—A quarterly dividend of two per cent. has been declared by this company, payable July 10, in Boston and New York.

The Central Coal Campany will hold its annual meeting in New York, on the 11th of July.

The North Chicago Rolling Mill Company will hold its annual meeting in Chicago, on the 15th of July.

Quotations and Sales of Stocks and Bonds.

For the week ending June 23, 1876.

STOCKS.

	Highest	Lowest	Closing	Shares sold.
Pennsylvania Coal Co	—	—	260	35
Consolidation Coal Co	—	—	40½	100
Spring Mt. Coal Co	—	—	53⅛	200
American Coal Co	—	—	*54	—
Maryland Coal Co	—	—	12½	—
Del., Lack., and West. RR. Co	108⅛	104¼	106⅛	18916
New Jersey Central RR. Co	81¼	72¾	74	30637
Delaware and Hudson Canal Co	109	105	106½	1407
Quicksilver Mining Co. pref'd	—	—	18	—
" " " Common	—	—	14½	100
Mariposa Land & Min. Co. pref'd	9½	6	9	2150
St. Louis & Iron Mountain RR	—	—	17	100
Lehigh & Wilkes-Barre Coal Co	—	—	*40	—
Total Shares sold				53645
Sales for the week previous				11082
Increase				42563

* Nominal.

BONDS.

	Inter'st	Sales.	Price.
Del., Lack. & West. 2d M	M. & S.	.....	.... @ ....
" " " 7's Con'ble	J. & D.	..	.... @ ....
Cent'l RR. of N.J., 1st M, New	F. & A.	5,000	110½@111
" " " 1st Cons	.....	8,000	104½@105
" " " Convert'le	M. & N.	15,000	@100⅛
Lehigh & W.-B'e, Con. Guar'd	.....	4,000	91½@ 93
Am. Dock & Imp. Mt. Bonds	J. & J.	7,000	... @100¾
Del. & Hud. Can., 1st M., 1891	.....	.....	.... @110
" " " 1884	.....	8,000	.... @110
" " " 1877	.....	.....	.... @ ....
" " " Coup. 7's, 1894	.....	.....	.... @ ....
" " " Reg'd 7's, 1894	.....	10,000	.... @ 108
St. L. & Iron Mountain, 1st M	F. & A.	4,000	... @102
" " " 2d M	M. & N	.....	.... @*79
Chesapeake & Ohio 6's, 1st M.	.....	3,000	28½@ 29
" " Ex. Coupon	.....	.....	... @ ....
Total sales		$64,000	

* Nominal.

Philadelphia Stocks.

PHILADELPHIA, Thursday Evening, June 22, 1876.

With but one exception our quotations of Philadelphia stocks continue to advance, the prices exhibiting a fractional improvement, confined within the range of ½ per cent. The aggregate transactions are some 8,000 shares less than those recorded in our last.

Lehigh Valley Railroad.—A little more activity is noticable in this stock, the sales amounting to nearly 1,500 shares, 1¼ per cent. representing the extreme range for the week, finally closing at 58¾, an advance of ¼ per cent.

Pennsylvania Railroad.—27,240 shares of this stock has changed hands, between 52⅛ and 53 as the outside quotations, closing at 52⅝, an advance of ⅛ per cent.

Reading Railroad.—Stock has been rather unsettled during the operations of the week, fluctuating beween 43¾ and 44⅞, closing ⅜ in advance of the quotation recorded in our issue of the 17th inst., with sales aggregating nearly 10,000 shares.

Lehigh Coal and Navigation Company is a fraction lower, and has ranged between 45¼ and 47¼, with transactions aggregating nearly 5,000 shares.

Auction Sales of Stocks and Bonds for the week have been as follows:

Danville, Hazleton and Wilkes-Barre Railroad Company.—$2 502.50 Coupon bonds due in 1887, at 15 per cent.

Chesapeake and Delaware Canal Company.—6 shares at $21 per share.

Dalzell Petroleum Company, of Venango County.—300 shares at 5c. per share.

Pennsylvania Steel Company.—75 shares at $68 per share.

Philadelphia and Reading Coal and Iron Company.—7 per cent. debentures, $15,000 at 79⅛ per cent.

Philadelphia and Reading Coal and Iron Company.—1st mortgage 7 per cent. Coal Land loan, West Point tract, $2,000 at 82 per cent.

The United New Jersey Railroad and Canal Company, announces a quarterly dividend of 2½ per cent. payable July 10th.

Bonds.—The activity in these has been fairly maintained with generally a fractional falling in the quotations.

Quotations and Sales of Stocks and Bonds.

For the week ending June 22, 1876.

STOCKS.

	Highest	Lowest	Closing	Shr's
Lehigh Valley RR. Co	60	58⅜	58¾	1487
Pennsylvania RR.	53	52½	52⅝	19954
Reading RR.	44⅞	43¾	44¾	9376
Lehigh Coal and Nav. Co	47¼	45¼	46½	4814
Penn. Canal	—	—	*9	—
Buck Mountain Coal Co.	—	—	*25	—
Fulton Coal Co.	—	—	*3½	—
Locust Mountain Coal Co	—	—	—	—
Westmoreland Coal Co	—	—	75	—
St. Nicholas Coal Co.	—	—	*1	—
Cambria Iron Co.	—	—	15½	4
Crane Iron Co.	—	—	*25	—
Emaus Iron Co	—	—	—	—
Pennsylvania Salt Manufact. Co.	—	—	69	19
Total shares sold				35,664
Sales for the week previous				43,829
Decrease				8,165

* These quotations are nominal.

BONDS.

	Sales.	Price
H. and B. T. RR. 1st mortgage, 7s	—	— @107
" " " 2d " "	—	— @104
" " " 3d " cons	—	— @ 42
Lehigh Valley RR. Con. mtg. 6s, cou	3,000	— @106
" " " 7s, 1910	—	— @—
" " " 6s Reg.	—	— @—
" " C. M. 6s 1923	7,000	— @ 98¾
Pennsylvania RR. 1st mtge. 6s	20,000	106¾@107
" " gen. " cou. 1910	3,000	106 @106½
" " gen. " 6s, reg	10,000	— @106
" " Cons. M. 6s reg	—	— @—
Phil. & Reading RR. 7s '93	—	— @107
" " G. M. 7s, reg.	2,000	— @106
" " " " 7s cou	—	— @*.07¾
" " new convertible 7s	6,200	— @100
" " 6s '44-'80	—	— @—
Phil. & Reading C. & I. Co. Deb. 7s	9,000	— @ 79
" " Locust Int. tract	3,000	— @ 83
Lehigh Coal & Nav. Co., 6s '84	3,600	103¾@104
" " " RR. 6s, '97	—	— @103½
" " " cov. m. 7s	—	— @—
" " " 6s gold loan	13,500	— @103¾
Penn. Canal, 6s	3,000	— @ 75
Penn. and N. Y. Canal, 7s	—	— @—
Ches. and Del. Canal, 6s	—	— @—
Susquehanna Canal, 6s	—	— @ 73
Delaware Division Canal, 6s	—	— @—
Susquehanna Coal Co. 6s	—	— @—
Buck. Mount Coal Co. 6s	—	— @—
Penn. Gas Coal Co. 6s	—	— @—
Honeybrook Coal Co. 7s	—	— @—
Total amount of sales	$85,700	

Closing quotations, in the absence of sales, represent the latest prices bid.

* Asked.

Gold and Silver Stocks.

NEW YORK, FRIDAY EVENING, June 22, 1876.

WITH but a single exception, mining stocks are lower, the whole market participating in a decline which is almost uniform throughout the list.

Justice.—This stock has advanced $1 per share, the ore slopes at the 600-feet level, as well as the upraise from that level, are looking and yielding well, and showing improvement as further opened and developed. At the 800-feet level the face of the south drift is also showing well, and is evidently fast nearing its intersection with the ore body from the 600-feet level. The face of the north drift and the cross-cut east from it, at the same level, shows well, and good progress is being made at both points. The face of the north drift at the 1000-feet level shows constant improvement, and good progress is being made with the south drift at the same level, also with the same incline. The flow of water continues strong, with no abatement, but is handled with ease, the pumping and other machinery operating splendidly.

Crown Point is down $3 per share. The receipts for the last fiscal year aggregate $2,588,966, of which $200,000 were in assessments. The ore extracted and reduced amounted to 130,182 tons for the year, showing a bullion account of $2,434,403, equal to $18.70 per ton.

Imperial Consolidated. The specimens of ore taken from the winze sunk below the 2000-feet level are very fine, and are really finer than the rich ore taken from the Crown Point and Belcher. The large percentage of gold is one of its best features, it being over 60 per cent. the specimens assaying $175 per ton. This stock is lower by $1 per share.

Raymond and Ely, is down to $8 per share. The May receipts of this Company amounted to $40,600.

Manhattan Silver Mining Company, Nevada, WELLS FARGO & Co. shipped from Austin on account of this company, for the month ending May 31, 1876, 87 bars of bullion, weighing 6,205 pounds and valued at $87 659.99.

Sutro Tunnel.—This work was in, on the 8th inst., 13,392 feet. The rock in the heading is quite hard to drill, and blasts very bad, making it necessary to blast two or three times in order to get the cut. There is no water in the face, but it is still running out behind. Number of holes drilled, 280; holes blasted, 407; aggregate depth, 2,130½ feet; average depth, 7·63 feet; powder consumed, 1,238 lb.; exploders consumed, 408; drills sharpened, 790; rock extracted, car-loads, two tons each, 489.

Bank of California.—The assessment levied by this corporation is the fifth which has been levied; it will be delinquent July 19. The stockholders have so far paid in $2,000,000 to repair the capital of this institution.

The San Francisco Mint is now closed for the annual settlement and repairs, and will re-open July 5 The coinage for the eleven months of the fiscal year amounted to $34,338,500.

New Mining Organizations.—We note the recent incorporation of the following mining companies:

Name.	Location of Mine.	Capital Stock.
Barcelona Central Mining Co.	Nye Co., Nevada	$7,500,000
Liguria Gold & Silver Mining Co.	" " "	7,500,000
Spanish Bell Silver Mining Co.	Nevada	6,000,000
Equator Mining Co.	Esmeralda Co., Nev	5,000,000
Republic Gold & Silver Mining Co.	Elko Co., Nev	5,000,000
Hurricane Mining Co.	Nevada	6,000,000
Montezuma Mining Co.	"	5,000,000
San Pedro Mining Co.	"	10,000,000
Grosh Consolidated Mining Co.	"	25,000,000
Herald Mining Co	"	10,000,000
Calcutta Mining Co.	"	10,000,000
Lone Tree G. & S. Mining Co.	"	10,000,000
Cueroo Mining Co.	California	10,000,000
Darwin Consolidated Mining Co.	"	10,000,000
Cerro Gordo Consolidated M. Co.	"	10,000,000
Ingo Mining Co	"	10,000,000
Garibaldi Mining Co.	"	10 000,000
Modoc Consolidated Mining Co.	"	10,000,000
Conley & Gowell Con. Min. Co.	"	10,000,000
Bank of Commerce.	San Francisco, Cal.	1,000,000
Pacific Powder Co.	" " "	500,000
Union Consolidated Mining Co.	California	1,500,000
Argentum Gold & Silver Min. Co.	Tuolumne Co., Cal.	255,000
Tuolumne Co. Waterworks	" " "	220,000
Centennial Gold Mining Co.	Nevada Co., Cal.	150,000
Silver King South Min. Co.	Pinal Co., Arizona	10,000,000
General Crook Mining Co.	Arizona	10,000,000

QUOTATIONS:

	No. of feet on Vein.	No. of shares.	June 15.	June 22.
Sierra Nevada ...	3,300	100,000	$12	$11
Union Consol'd..	600	100,000	11	11
Mexican.....	600	108,000	28	28
Ophir.....	675	108,000	52	50
California	600	540,000	75	74
Consol'd. Virginia	710	540,000	63	60
Best & Belcher...	540	100,800	48	48
Gould & Curry..	612	100,800	15	14
Savage.....	771	112,000	18	*18
Hale & Norcross.	400	112,000	64	9
Chollar Potosi..	1,400	28,000	85	78
Alpha Consol'd...	306	30,000	52	47
Imperial Con....	468	500,000	7	6
Yellow Jacket....	957	120,000	29	32
Kentuck	95	30,000	12	12
Crown Point.....	541	100,000	13	10
Belcher	1,040	104,000	18	17
Overman	1,200	38,400	61	59
Caledonia	2,188	100,000	9	8
Justice	2,100	105,000	21	22
Raymond & Ely..	5,000	30,000	10	8
Meadow Valley...	4,400	60,000	1	1
Eureka Consolid..	.....	50,000	11	11
a G. V.....	1,680	20,000	3	3
Hill.....	5,400	54,000	7	7
.....	3,000	110,000	9	9

*Shares increased June 19, 7 for 1.

Copper Stocks.

Specially reported by Messrs. WILSON W. FAY & Co., Bankers and Brokers, Room 7 Traveller Building, 31 State Street, Boston.

BOSTON, THURSDAY EVENING, June 22, 1876.

There is no new feature in the market to mention, and the same general dullness prevails. Calumet steady at 163 bid, with all the sales at that. Copper Falls has improved to 400, but closes at that asked. The mine is in receipt of better letters from the mine and the assessment of $2 per share is coming in much better than was expected. At a special meeting of the Duncan Silver Mining Company, held June 15, an assessment of 500. per share was levied payable July 13, 1876. Franklin weaker at $9 to $9.50. Quincy steady at 43 bid. Rockland 28 bid. Small coppers neglected.

Sales for the week have been as follows: 10 shares of Calumet and Hecla at $163 per s are; 500 shares of Duncan Silver at $1.12½ per share, and 50 shares of Copper Falls at $4 per share.

Highland Copper Company.—The annual meeting of this company will be held in Boston on the 28th inst.

DESCRIPTION.	Par Value.	No. of Shares.	CLOSING. Bid.	Asked.
Allouez	$50	20 000	$11 00	$13 00
Calumet and Hecla.....	25	80,000	163 00	164 00
Central..	25	20,000	30 00	30 50
Copper Falls.....	50	20,000	3 50	4 00
Dana.....	25	20,000	8	12¾
Franklin	25	20,000	9 00	9 50
Humboldt.....	25	20.000	9	11
Madisca.....	25	20,000	25	30
Mesnard	25	20,000	55	60
Minnesota.....	25	20,000	1 62½	2 87½
National	15	20,000	1 00	1 12½
Osceola	25	40,000	21 00	22 00
Petherick.....	25	20,000	53	60
Pewabic.....	25	20,000	3 25	3 75
Phenix	25	20,000		
Quincy	25	20,000	43 00	44 00
Ridge	25	20,000	4 62½	5 00
Rockland	25	20,000	28	33
International Silver.....	20	60,000	9	11
Star	25	20,000	45	51
Superior.....	25	20,000	10	12½
Duncan Silver*..... ...	20	60,000	1 12½	1 15

*Assessment paid.

Gas Stocks.

NEW YORK, FRIDAY EVENING, June 23, 1876.

No improvement has occurred in the market for Gas Stocks, the general list continues dull and heavy, and with the exception of some forced sales through the Auctioneers, the transactions are hardly worth mentioning.

Metropolitan Gas Company. This stock exhibits an advance of about $3 per share, a few shares of this stock sold at auction on the 21st inst. at $14.75 per share.

People's Gas Company of Brooklyn. 500 shares of this stock sold at auction on the 21st inst. at $50 per share. This price is just $50 per share, or a decline of one-half from the rate prevailing on the first of the year.

Lighting the Piers of New York. Alderman Morris has offered a resolution in the Common Council directing the Commissioner of Public Works to cause the piers and bulkheads of the City to be lighted, and directing the Department of Docks to co-operate in such lighting, the expense to be charged to the appropriati n for lamps and gas. A similar measure to this passed the Board of Aldermen in February last, and as we announced then, was vetoed by the Mayor, there being no appropriation in existence from which to depay the expense of this very necessary work.

People's Gas Company of Baltimore. 30 shares of this stock has recently changed hands on the Baltimore stock market at 25¾ per share.

Baltimore Gas Company. We note recent sales of $1,000 of the Certificates of this company at 105 per cent.

San Francisco Gas Company. About 200 shares of this stock has recently changed hands at from par to ½ per cent. premium.

St. John (New Brunswick) Gas Company. We note recent transactions in the stock of this Company in small amounts at from 1½ to 2½ per cent. above par.

Gas in Paris. The consumption of gas has very largely increased in Paris during the last twenty years. Thus in 1855, it did not exceed 40,747,400 cubic meters; in 1875, it had risen to 175,938,244 cubic meters. The number of private gas consumers in 1875 was 111,221. And the number of public lamps 33,000; it had also 1,014 miles of gas pipes.

The following list of Companies in New York and vicinity are corrected weekly by GEORGE H PRENTISS, Broker and Dealer in Gas Stocks, No. 30 Broad st., N. Y.

Quotations "bid" and "asked" of New York City and Vicinity Gas Companies are on the $100 of stock and not on one share.

Companies in New York and Vicinity	Cap. Stk.	Par.	last Dividend.	When Paid.	Bid.	Askd.
			pr.c			
Mutual, N. Y.....	$5,000,000	$ 100	2½	Jan. '76	114½	115
" " Bonds	900,00	1,000	†3½	Feb. '76	105	
NewYork, "	4,000,000		5	Jan. '76	130	135
Metropol. "	2,500,000	100	5	Mar. '76	145	147½
" " Certf.	1,000,000	...	3½	" "	103⅛	
" " Bonds	500,000	1,000	3½	Jan. "	102	102½
Harlem "	1.850,000	50	4	Feb. '76	118	122
Manhattan" ..	4,000,000	50	10	Jan. "	235	240
Brooklyn, B'klyn..	2,000,000	25	5	June '76	185	195
Nassau " ..	1,000,000	25	4	Jan. '76	75	80
" " Certf.	700,000	1,000	3½	Nov. '76	94	95
People's "	1,000,000	10	3½	Jan. '76	45	50
" " Certf.	300,000	1,000	3½	Jan. '76	85	87½
" " Bds	325,000	....	3½	Feb. "		95
Metropol. "	1,000,000	10	3½	Nov. '75	70	75
Wmsburgh " ...	1,000,000	50	5	Jan. '76	122	130
" " Certf.	1,000,000	....	3½	Jan. "	100	102
Citizen's "	1,200,000	20	2½	Jan. '76	88	90
" " Certf.	320,000	1,000	3½	April "	99	101
J. C. N.J.....	386,000	20	5	July,'75	160	170
Centl. Westch. N.Y.	466,000	50	4	July, "	95	100
Subur'n " "	390,000	50				95

† Gold.

Companies out of Town.*	Cap. Stk.	Par	Bid	Askd
People's " " of J. C.....			120	133
¶Citizen's G. L. Co., New'k. N.J.	1,095,000	50	85	90
Perth Amboy G. L. Co., N. J....		25		95
Hempstead" " L. I., N.Y.	40,000	100		100
Jamaica, " " " "	25,000	100		100
Richmond Co., S. I. "	300,000		100	105
Citizens', Rochester, "		100	45	50
Rochester Gas Co., "		100	50	
‖People's G. L. Co. Albany,"	1,000,000	100		25
§Mutual " Buffalo "	750,000	100	48	55
Mutual " Detroit Mich.		50	18	
TroyG. L. Co., Troy, N. Y.....			108	
Citizens " " "	600,000	100		100
Brockport, N. Y., G. L. Co.	25,000	100	60	80
Saugerties G. L. Co.....	15,000	100	100	115
†Baltimore G. L. Co., Balt., Md	2,000,000	100	155	1 65
St. Louis G. L. Co., St.Louis, Mo	600,000		110	130
People's G. L. Co., Balt., Md ..	2,000,000	25	24⅛	25⅜
Hannibal G. L. Co., Hanni., Mo.	100,000	100	95	100
La Clede, St. Louis, Mo	1,200,000	100		102
Lewiston G. L. Co., Lewis., Me	400,000	100	50	85
Chicago G. L. Co., Chicago, Ill.	2,000,000	100	125⅛	
Jacksonville, Ill.....	120,000	100	82	
‡Lima, Ohio.....	60 000	100	10	
Derby G. L. Co., Derby, Conn..	160,000	100	60	80
Woonskt G. L. Co. Woonskt, R.I.	150,000	100	100	
Fort Wayne G. L. Co. F. W., Ind		100	90	100
North. Liberties G. L. Co. Phila.		25	29	
Wilkes-Barre G. L. Co W. B. Pa.		50	70	
Washington G. L. Co., Phila....			42	43
Pottsville, Pa. Gas Co		50	40¼	
Portland G. L. Co. Portland, Me	350,000	50	72	75
Hartford G. L. Co., Hartford, Ct	700,000	25	41	
Boston G. L. Co., Boston, Mass.	2,500,000	500	785	790
East Boston, Mass		25	132	
Chelsea G. L. Co, Chelsea, "	300,000		139	
Cambridge G. L. Co., Cam., "	700,000		132⅜	
Louisville G. L. Co., Louis., Ky.			127	
Cincinnati G. L. Co , Cincin, O..				200
Carondelet G. L. Co., Mo ...		50		6⅜
S. F. G.L. Co, San Francisco, Cal	10,000,000	100	99¾	99½
Stillwater G. L. Co., Minn.... .	50,000	50		26
City G. L. Co. Montreal, Can....	1,440,000	40	165	166
Consumers G. L (old.) Tor., Ont	600,000	50	133	
Hamilton G. L. Co., Ont.....	150,000	40	112½	
Halifax G. L. Co., Halifax, N.S..	400,000	40		147½

* These quotations represent the latest obtainable prices at which sales were made.

† This Company has issued $1,000,000 in certificates in addition to their stock indebtedness, on which they pay interest at the rate of 6 per cent. gold.

‡ This Company has $30,000 in bonds outstanding.

§ $200,000 represents the bonded indebtedness of this Company.

‖ $350,000 of the indebtedness of this company is represented by bonds.

¶ $124,000 of the indebtedness of this company is represented by bonds; also $53,000 in certificates, which is included in the aggregate stock debt quoted.

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